

THE INDUSTRY'S RECOGNIZED AUTHORITY

# ROCK PRODUCTS

CEMENT • SAND AND GRAVEL • CRUSHED STONE • SLAG • LIME • GYPSUM  
READY-MIXED CONCRETE • CONCRETE PRODUCTS • INDUSTRIAL MINERALS

AUGUST  
1944

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Cement Industry After the War  
Post-War Highway Cements  
Plans for Cement Mill Changes  
Prestressed, Reinforced Roof Slabs  
Evaluating Aggregate Specifications  
Selling Agstone In Newspapers

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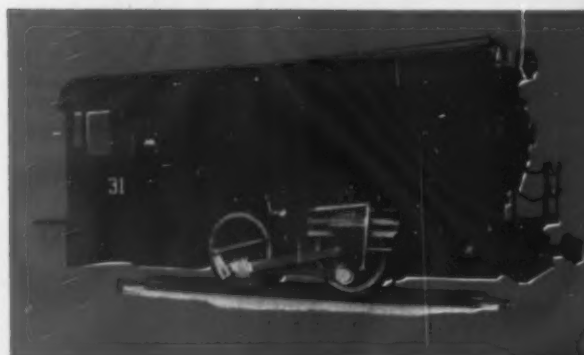
COVER: Modern plant of The Permanente Cement Co.



## POST-WAR CEMENT OPERATIONS

AUG 23 1944

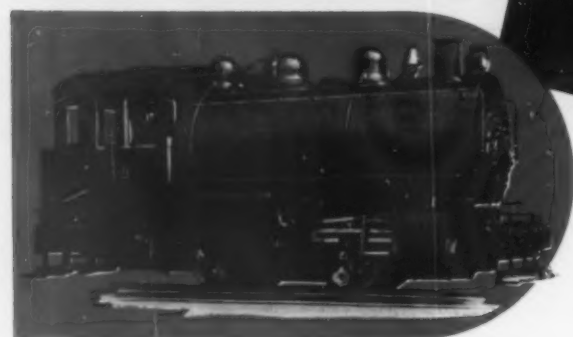
# PORTER *Steam Locomotives*



**Lower Operating Costs**

**Less Maintenance**

**Greater Availability**



Here are some of  
the features that give PORTER  
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and Fireless Steam Locomotives.  
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## Rubber fingers that pick up bags of sugar


### *A typical example of B. F. Goodrich development in rubber*

GETTING hundred pound sacks of sugar up a grade that looks like this  was causing plenty of trouble in a Louisiana sugar mill. The bags could be trucked to within a few feet of the Mississippi river. But they had to be conveyed across a high levee to get to the wharf. The bags simply slipped off regular smooth-surfaced conveyor belts. Then wire mesh belts and belts with cleats across them were tried. But both the wire and the ridges tore the bags and spilled good sugar on the river bank. It looked as though the

only remedy was to lengthen the conveyor to reduce the steepness of the slope—a costly and inefficient way of handling sugar.

Then B. F. Goodrich learned of the problem and suggested a belt of theirs made with 3000 tiny flexible "fingers" per square foot. This B. F. Goodrich development was originally designed to carry cartons up and down inclines in food plants. But it proved to be the answer for the sugar bags, gripping them firmly but gently. Tearing of bags became a thing of the past. That

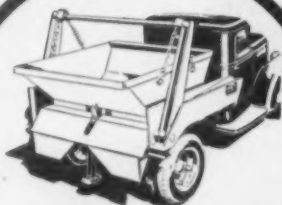
was five years ago and the original belt is still in service down on the levee.

B. F. Goodrich men often find that a product developed for one purpose will solve an entirely different problem. That's why they suggest you consult a B. F. Goodrich distributor or write the B. F. Goodrich Co. if you have a problem that might be solved with rubber—natural or synthetic. The B. F. Goodrich Company, Industrial Products Division, Akron, O. 

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Make your trucks do double duty by equipping them with **LOAD LUGGERS!**

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EQUIPMENT & MFG. CO.  
KNOXVILLE TENNESSEE

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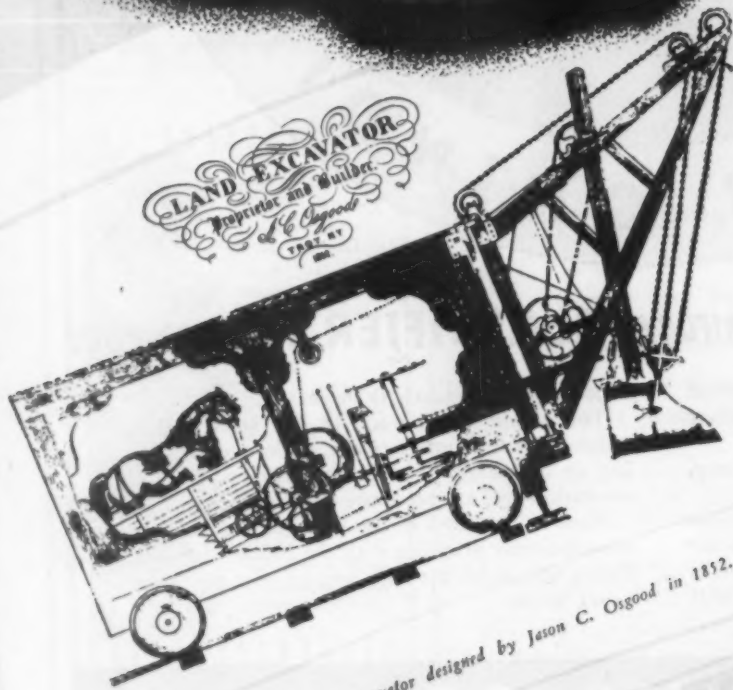
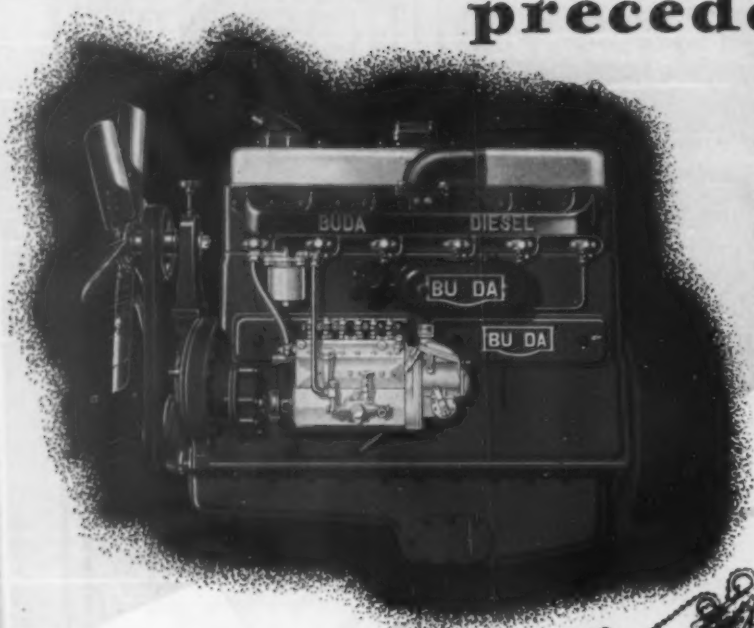
ROCK PRODUCTS, August, 1944



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**E**xcavating earth a century ago was a job that taxed the ingenuity of experts. The missing factor in equipment, otherwise fairly efficient, was modern power. Today you can have the finest, most efficient, economical power ever developed by specifying BUDA Diesels.



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#### FOR YOUR MACHINERY

No. 3—Ideal for general oil type lubrication. Ring oiled bearings, wick feeds, sight feeds and bottle oilers.

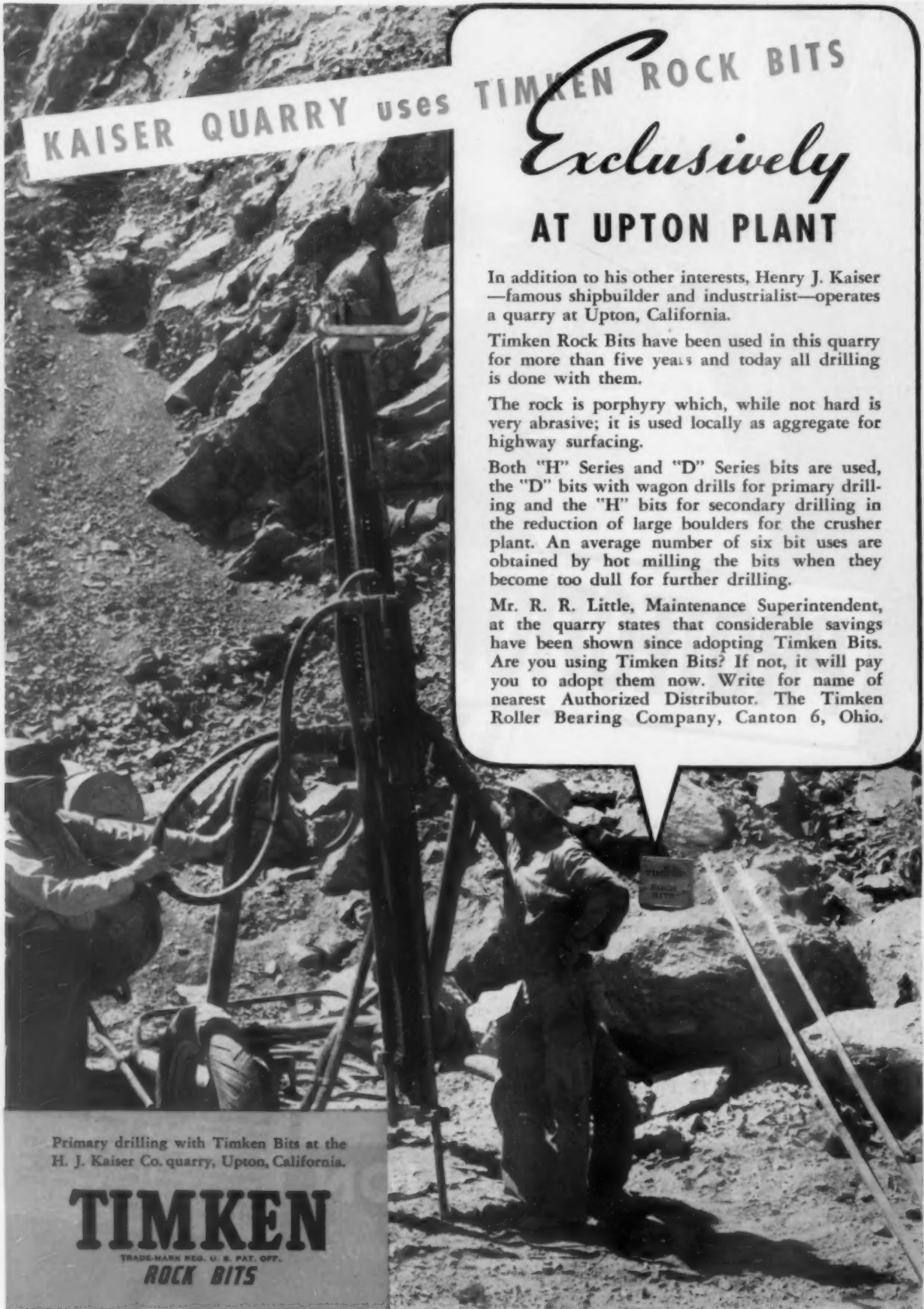
No. 6—Because of its high film strength and long life reflects outstanding performance in most types of enclosed gears (speed reducers).

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TIMKEN ROCK BITS

*Exclusively*

AT UPTON PLANT

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Timken Rock Bits have been used in this quarry for more than five years and today all drilling is done with them.

The rock is porphyry which, while not hard is very abrasive; it is used locally as aggregate for highway surfacing.

Both "H" Series and "D" Series bits are used, the "D" bits with wagon drills for primary drilling and the "H" bits for secondary drilling in the reduction of large boulders for the crusher plant. An average number of six bit uses are obtained by hot milling the bits when they become too dull for further drilling.

Mr. R. R. Little, Maintenance Superintendent, at the quarry states that considerable savings have been shown since adopting Timken Bits. Are you using Timken Bits? If not, it will pay you to adopt them now. Write for name of nearest Authorized Distributor. The Timken Roller Bearing Company, Canton 6, Ohio.

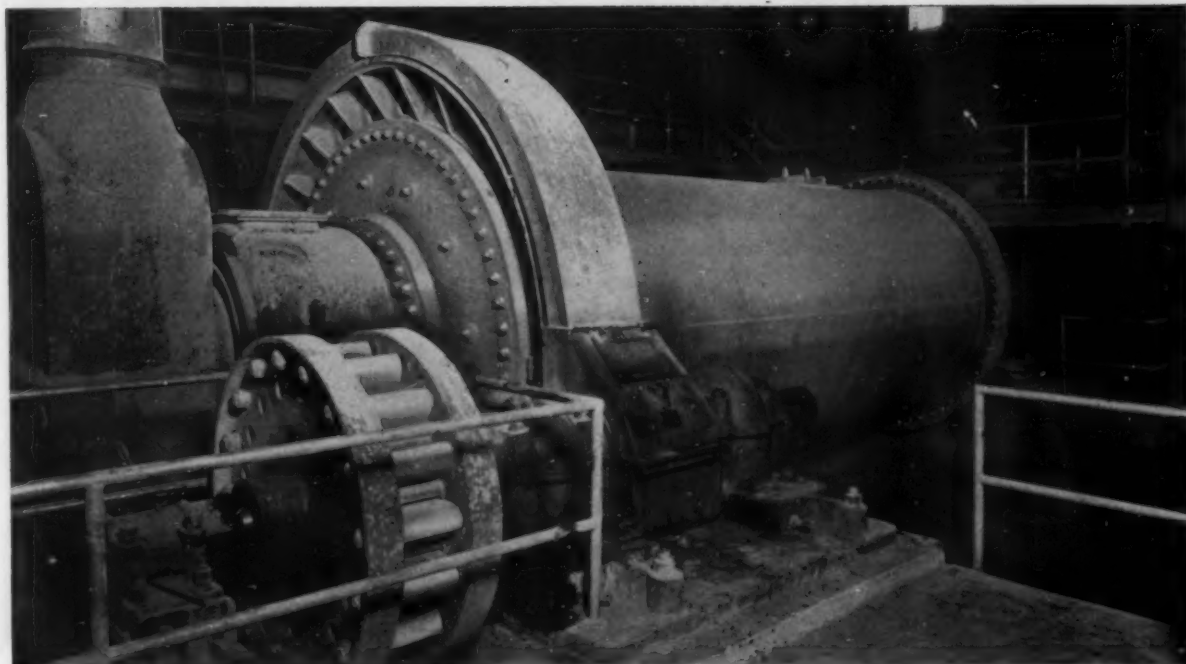
Primary drilling with Timken Bits at the H. J. Kaiser Co. quarry, Upton, California.

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TRADE-MARK REG. U. S. PAT. OFF.

**ROCK BITS**

# Compartment Mills



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Elevators

From 6'-0" dia. x 20'-0" to 8'-0" dia. x 50'-0",\* in single, two, three and four compartments—that's the range of hundreds of Traylor Compartment Mills that have been preferred and purchased by the world's leading cement, chemical and process plants.

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# IT HAS NO EQUAL

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Supertwist, Suro-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company



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For mud and  
marsh  
specify  
Goodyear Suro-Grip

For drawn dirt  
movers—specify  
Goodyear All-Weather  
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that dirt and stones are forced out as the tire revolves. It won't trap and hold stones!

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WHY  
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of Basic Processing Equipment — Recommends

# Recommendations

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The significant fact is that A-C builds *all types* of basic processing equipment . . . many different styles

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{ Ball, Ballpeb & Pebble Mills

{ Multi-Stage

{ Compeb (1, 2, 3 or 4 Stage)  
{ Ballpeb (Fine Grinding Only)

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{ Style "B", Centrifugal  
{ Low Head, Horizontal  
{ Ripl-Flo

{ Light & Fine

{ Aero-Vibe  
{ Electro-Magnetic  
{ Laboratory  
{ Low Head Gyratory Sifters

## HANDLING

{ Conveyors

{ Pan, Apron, Spiral  
{ Elevators  
{ Electro-Magnetic

{ Feeders

{ Rotary, Ferris-Wheel,  
{ Cantilever Grizzly, Cone,  
{ Swing, Table Types  
{ Electro-Magnetic  
{ Pan, Apron, Spiral

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{ Electric  
{ Friction

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{ Sludge, Alumina, Magnesite,  
{ Ore Concentrates

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the Exact Type Suited to Your Particular Needs!

☆ *To see it in operation means convincing yourself, at once, that one truck equipped with a Dempster-Dumpster will do the work of 3 to 5 of your present trucks.*

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TRADE MARK REG.

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3—As each body is loaded, hoisting unit picks up loaded body and automatically places it in carrying position, all under full control at truck driver's seat.

4—Load is hauled to point of disposal where it is automatically dumped or lowered to floor position intact if preferred. If dumped, empty body is returned to point of loading. One truck in a never ending cycle of full service with no standing idle time for truck or driver is the result.

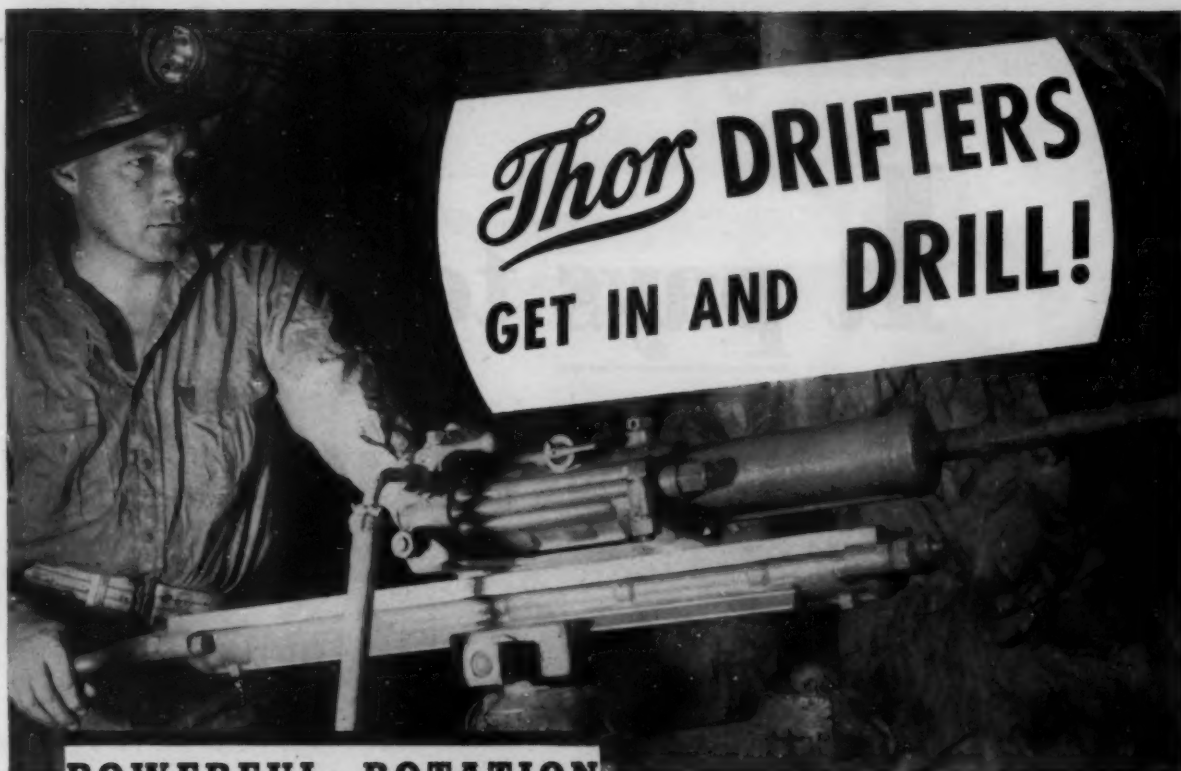


**There Is A DEMPSTER-DUMPSTER Built For Every Materials Handling Problem**

**DEMPSTER BROTHERS, INC.**

Knoxville 17, Tennessee





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### Add more Footage per Shift

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**BALANCED POWER**—Precise control of air input provides a full cushion of live air at both ends of piston stroke for balanced, full-power performance.

**SMOOTH OPERATION**—Every stroke is powered by the same measured quantity of air for uniform, smooth operation.

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A major reason we've been able to supply our Multiwall customers is the size and flexibility of our production facilities.

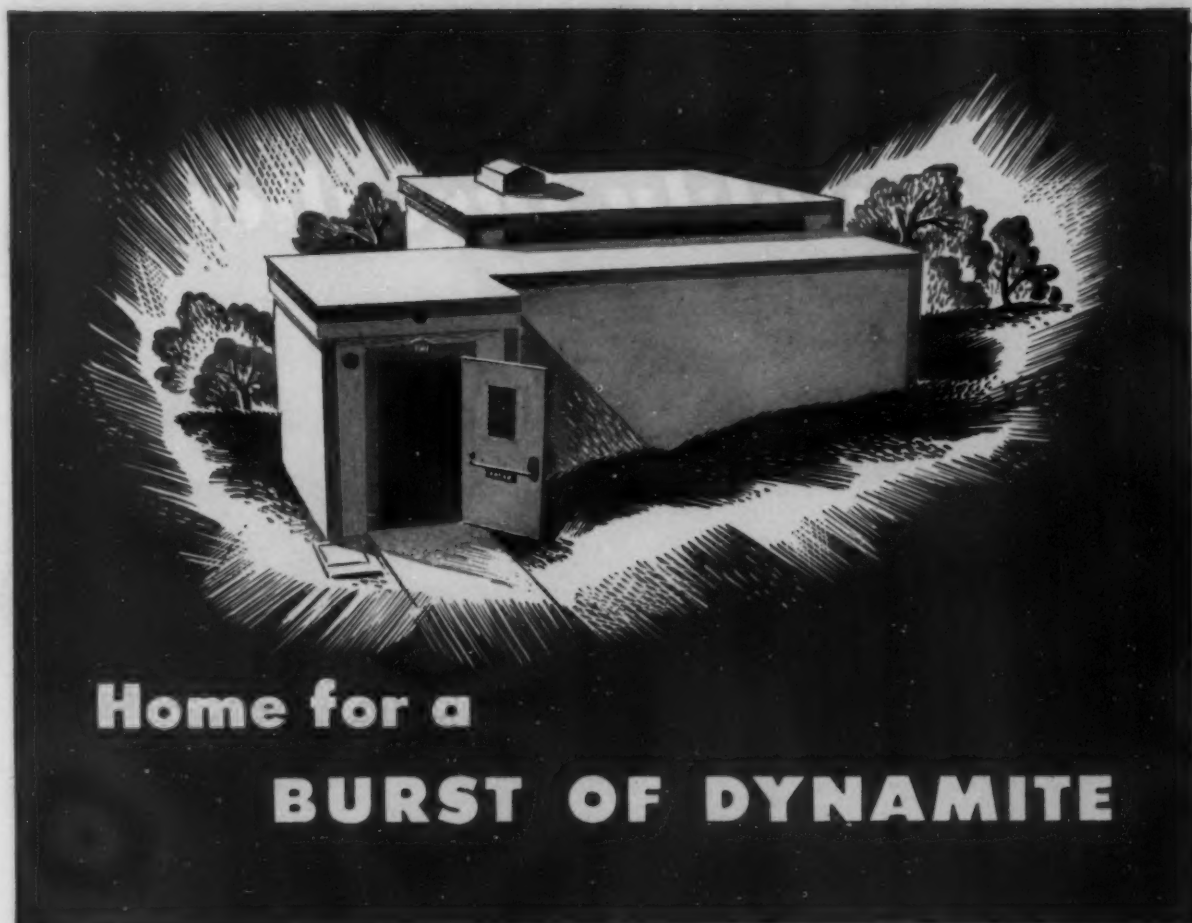
### Bemis Multiwall Plants at

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# SHIPPED INTACT

## *Quickly Installed*



### ... CP "Package Type" Compressor

**S**HIPPED intact, all ready for external connections, CP Type Y Compressor is easily and quickly installed. It is exceptionally compact, requiring only minimum floor space. Large area Simplate valves, multi-step capacity regulation, effective intercooling, precision bearings and force-feed lubrication are responsible for its low power consumption and low maintenance costs. CP Type Y compressors with built-in or direct coupled motors

or with V-belt drive are available in capacities of 300 to 900 c.f.m. at 80 to 125 pounds pressure; other sizes available for higher and lower pressures. Write for Bulletin 766.

There is a CP Compressor, stationary or portable, for every air requirement from 25 to 10,000 c.f.m. for pressures up to 5,000 pounds.

★★★★★★★  
PNEUMATIC TOOLS  
ELECTRIC TOOLS  
(Nicycle...Universal)  
ROCK DRILLS

CHICAGO PNEUMATIC  
TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★  
AIR COMPRESSORS  
VACUUM PUMPS  
DIESEL ENGINES  
AVIATION ACCESSORIES



# How to Crush

## 330,000 TONS OF CLINKER AT NO COST FOR REPLACEMENTS

"We have put approximately 330,000 tons of clinker through the Tel Smith Gyrasphere since installation of the crusher in March 1940. Operation has been entirely satisfactory and we have not found it necessary to replace any part of the Gyrasphere."

— PORTLAND CEMENT COMPANY \*

\* NAME ON REQUEST



# TELSMITH

## Gyrasphere SECONDARY CRUSHER

Crushing Portland cement clinker... to a minus  $\frac{3}{8}$ " or minus  $\frac{1}{4}$ " product... 330,000 tons of it... over four years of steady crushing... but not one cent for repair expense, except for replaceable oil filters! The crusher is a Tel Smith Gyrasphere Secondary Crusher. And its owner is a mid-western Portland cement company (name given on request).

In their system of handling, clinker goes from storage to the Gyrasphere crusher... and then direct to the SMITH ENGINEERING WORKS, 508 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

clinker mills. Owing to limited storage space, clinker is fed to the crusher very hot... over 300 degrees! The crusher gets hot, too—its lubricating oil is water-cooled. In the Tel Smith Gyrasphere *double protectors*... four flexible labyrinth seals plus two piston rings... cut oil and maintenance costs to a new low.

Find out *how* you can get finer crushing, continuous operation, greater capacity... with less trouble, less power, less upkeep. Get Bulletin Y-11.

Y-6

Cable Addresses: Sengworks. Milwaukee—Concrete, London

51 East 42nd St.  
New York 17, N.Y.  
Brandeis M. & S. Co.  
Louisville 5, Ky.

211 W. Wacker Drive  
Chicago 6, Ill.  
Charleston Tractor & Eqpt. Corp.  
Charleston 22, W. Va.

713 Commercial Trust Bldg.  
Philadelphia 2, Pa.  
Roanoke Trac. & Eqpt. Co.  
Roanoke 7, Va.

19-21 Charles St.  
Cambridge 41, Mass.  
North Carolina Eqpt. Co.  
Raleigh & Charlotte, N. C.

G. F. Seely & Co.  
Toronto, Ont.  
Mines Eng. & Eqpt. Co.  
San Francisco 4—Los Angeles 14  
Wilson-Weesner-Wilkinson Co.  
Knoxville 5 and Nashville 6, Tenn.

Printed in U. S. A.

# WHAT'S THE ANSWER?



Never before have so many questions faced the American people as they do today. No wonder that perplexity is the common expression to be found wherever you go.

War . . . its very nature being that of destruction . . . disrupts the normal, sane way of living. Happily, recent events are causing the pendulum to take a gigantic swing toward the cause of the Allies, registering a tremendous increase since Pearl Harbor.

This very fact brings up many questions. Business men, and especially those engaged in Crushed Stone, Sand, Gravel, Concrete, Rock and kindred Industries, want to know about their source of supply in the post-war period.

As far as Industrial Rubber Goods are concerned, **QUAKER**, with 59 years of successful operation, is the logical answer.

Quaker's factory and management are devoted exclusively to the many products of Industrial Rubber Goods. Everyone at Quaker, from the chief executive to all employees, are all Industrial Rubber minded . . . no other product comes across our path to detract from our set purpose of producing this type of Quality merchandise.

Progressive Quaker offers outstanding qualifications that merit your consideration:

**FINANCIAL**—Quaker enjoys highest commercial rating.

**PRODUCTION**—Quaker, by thoughtful scheduling, with proper manufacturing supervision, enables increased tonnage each year.

**TECHNICAL ASSISTANCE**—Quaker's Sales Organization includes technical experts who are at your Service to assist you on any problems you may have regarding Belting, Hose or Packings.

**DISTRIBUTION**—Quaker enjoys national distribution of its products.

Keep Quaker in mind when you need a Conveyor or Transmission Belt; Hose for any purpose; Rod and Sheet Packings. Give Quaker serious consideration on all your Industrial Rubber Products.

*"If there is a way to get it done—Quaker will do it!"*

## QUAKER RUBBER CORPORATION

PHILADELPHIA 24, PA.

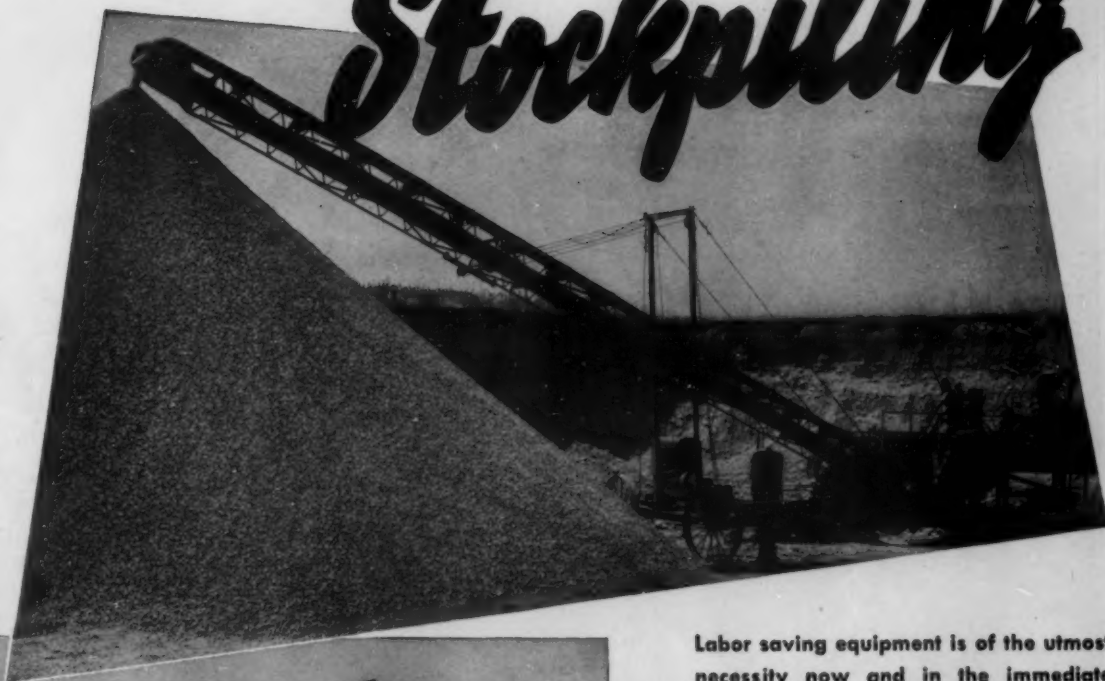
New York 7 • Cleveland 15 • Chicago 16 • Houston 1



Western Territory

**QUAKER PACIFIC RUBBER CO.**  
SAN FRANCISCO 5      LOS ANGELES 21

# Stockpiling



Labor saving equipment is of the utmost necessity now and in the immediate months to come. To meet this need, WPB has released a limited schedule of Barber-Greene Model 82-A Bucket Loaders and Wheel Mounted and Permanent Belt Conveyors.

Preparation of aggregate and stock piling sized material is greatly facilitated with Barber-Greene Permanent and Portable Belt Conveyors. Reclaiming from stock piles is speeded up using the high capacity Model 82-A Bucket Loader, requiring less idle truck time. Often truck drivers easily fill in as loader operators loading their own trucks.

Barber-Greene engineers can assist you in utilizing your present equipment to its fullest advantage, as well as suggesting new equipment if it is necessary. Write to Sales



Engineering Department,  
Barber-Greene Company,  
Aurora, Illinois, U.S.A.

44-24

# BARBER-GREENE

AURORA ILL.



## Friend of the "Cleaner Uppers"

As the invasion forces go forward shell-holes must be filled—tottering walls brought down and the rubble of destruction removed. And friendly, dependable Wickwire Rope is an old hand at helping the boys who clear the roads and keep supplies moving.

Long-lasting Wickwire Rope is a world traveller these days—as Liberty ship rigging, and in reels for our fighters who are doing the jobs that lead to victory. There are jobs here at home that are vital to

success and they also call for strong wire rope. If you need Wickwire Rope it's available on priority, but it pays to make what you now have last as long as possible.

We will be happy to help you with your wire rope problems and also to send you copies of "Know Your Ropes" which offers helpful advice on proper selection, application and usage. Write Wickwire Spencer Steel Co., 500 Fifth Avenue, New York 18, N. Y.



### TO AVOID SHOULDER WEAR

Exact alignment of sheaves is important. Our Free book "Know Your Ropes" tells why and shows how to do it. This and 39 other wire rope life savers; 78 "right and wrong" illustrations and 20 diagrams and charts are all contained in this 82 page book.

SEND FOR YOUR FREE COPY

Send your wire rope questions to:



# WICKWIRE SPENCER STEEL COMPANY



500 FIFTH AVENUE, NEW YORK 18, N. Y.

Ablene • Buffalo • Chattanooga • Chicago • Detroit • Houston • Los Angeles • Philadelphia • San Francisco • Tulsa • Worcester



# AMERICA IS *Built with Aggregate!*



Photo by Ewing Gallou

## THE IOWA LINE

of Material Handling Equipment  
Includes

ROCK AND GRAVEL CRUSHERS  
BELT CONVEYORS—STEEL BINS  
BUCKET ELEVATORS  
VIBRATOR AND REVOLVING  
SCREENS  
STRAIGHT LINE ROCK AND  
GRAVEL PLANTS  
FEEDERS—TRAPS  
PORTABLE POWER CONVEYORS  
PORTABLE STONE PLANTS  
PORTABLE GRAVEL PLANTS  
REDUCTION CRUSHERS  
BATCH TYPE ASPHALT PLANTS  
TRAVELING (ROAD MIX)  
PLANTS  
DRAG SCRAPER TANKS  
WASHING PLANTS  
TRACTOR-CRUSHER PLANTS  
STEEL TRUCKS AND TRAILERS  
KUBIT IMPACT BREAKERS

## GOOD HIGHWAYS MAKE GOOD NEIGHBORS

Whether highways link nations together, like the Alaska Military Highway or Pan American Highways, or are the Farm to Market secondary roads, their primary object is to bring people and goods closer together. Good roads are built with aggregate, and, under the contract system of construction, are symbolic of the freedom of the American way.

More and more aggregate producers are finding that the production of low cost aggregates is the result of refinements in crushing equipment developed by the combination of construction "know how" and American ingenuity which produced the line of Cedarapids plants. The Iowa line ranges from single units to complete plants which can be, engineered to meet any aggregate production problem.

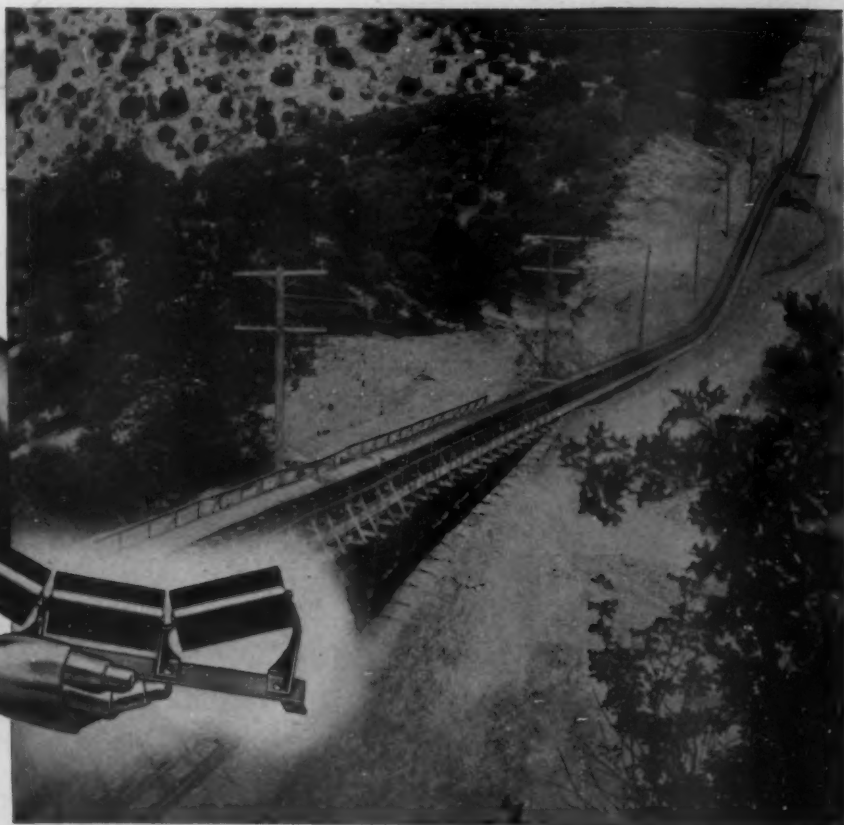


Come to Iowa first, it's Headquarters for aggregate producing equipment!

**IOWA MANUFACTURING COMPANY**

**CEDAR RAPIDS, IOWA**





## His Idlers Handle 109,440,000 Ton Miles of Aggregate

11,400,000 tons of aggregate moved 9.6 miles in four years—that is the remarkable record of the belt conveyor system operated by Columbia Construction Company to haul aggregate for the construction of Shasta Dam. The heart of this huge conveyor system consists of standard belt idlers designed by Rex C. E.—Rex Conveying Engineering.

And, even more remarkable, the entire system, according to its operator, is in good enough shape to start over again on an equal job.

Traversing rivers, hills, railroads and highways, the conveyor travels at a rate of 550 ft. per minute, delivering on the average 1000 tons per hour—with a maxi-

mum as high as 1400 tons. Maintenance and repair costs have been extremely low. The entire line is kept running by seven operators and twelve maintenance men—about two men per mile.

The engineering skill gained by Rex C. E. in his more than 50 years' experience in designing and applying materials handling equipment played a big part in the successful operation of the system. That skill has proved equally successful on many other jobs—and can prove helpful to you. Rex C. E. and his staff of trained engineers are always at your service. For complete information, write Chain Belt Company, 1649 West Bruce Street, Milwaukee 4, Wisconsin.



# CONVEYORS

CHAIN BELT COMPANY OF MILWAUKEE

# SIMPLICITY

*that  
reduces  
Handling  
Costs!*



OTHER THINGS A  
NORTHWEST WILL DO!

- Handle coal and ashes.
- Load and unload any kind of conveyance.
- Handle any type of material, loose or solid.
- Handle magnet for scrap, turnings and borings.
- Goes any place to make out-of-the-way corners of the yard usable.

**L**OOK at the deck of the Northwest above. Simple! Few shafts! Few gears! All high speed shafts are mounted on self-aligning ball or roller bearings. Cast alloy steel machinery side frames provide rigidity. The power take-off is a helical gear drive mounted on anti-friction bearings and running in an oil bath.

Here is the high quality of design and the simplicity that means few parts and assures accessibility for adjustment and easy upkeep.

Is it any wonder that Northwests have made such a reputation for versatility and dependability. These are going to be the real cost savers in tomorrow's production.

**NORTHWEST ENGINEERING COMPANY**  
1620 Steger Building • 28 East Jackson Boulevard • Chicago 4, Illinois

# NORTHWEST

*The Crane that goes Anywhere!*

*Let's get  
acquainted  
INVESTIGATE  
THIS Different  
CRAWLER  
CRANE*



## Can you identify a Synthetic Rubber Conveyor Belt by looking at it?



No, to the eye, a synthetic rubber conveyor belt looks exactly like one made of natural rubber. Nor can you judge by its looks how much compounding skill has gone into it, how carefully it has been fabricated, to what rigid tests and inspections it has been put.

These are the things that determine the tonnage a belt will convey during its life, the trouble-free service it will deliver, the savings it will effect in operation.

The one safe guide is the maker's name. U.S. Rubber Conveyor Belts have long enjoyed the highest reputation. The "U.S." Belts of synthetic rubber are upholding that reputation. Each is individually designed...each engineered from the scene of action for a particular installation.

"U.S." Synthetic Rubber Belts are the result of unremitting research, of accumulated technical knowledge, of skillful craftsmanship applied through modern, scientific laboratory and manufacturing facilities.

**SERVING THROUGH SCIENCE**



**LABORATORY CONTROL**—is a basic rule in the compounding of materials for U.S. Rubber Conveyor Belts. The particular type of synthetic rubber to be used is determined by the service conditions to be met; the ingredients are mixed with scientific exactness.



**A GIANT GOES FORTH**—Crated and ready for shipment this big fellow is on its way into service at an important coal mine. U.S. Rubber Conveyor Belting—hundreds of thousands of feet of it—is helping to handle big loads of vitally important products such as coal, limestone, ore and other bulk materials.

*Listen to the Philharmonic-Symphony program over the CBS network Sunday afternoon, 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.*

# UNITED STATES RUBBER COMPANY

1230 SIXTH AVENUE, ROCKEFELLER CENTER, NEW YORK 20, N. Y. • In Canada: DOMINION RUBBER CO., LTD.

**"RIGHT DRESS!"**  
**FOR TOUGH**  
**SERVICE**



**HAMMOND**

**SEWN AND PASTED VALVE AND OPEN MOUTH**  
**MULTI-WALL BAGS**

HAMMOND multi-wall Paper Bags—with or without special moisture proof Asphalt Laminated walls—deliver your products safely to America's industrial front. Let Hammond Service Men assist you in selecting the right bag for your requirements.

**HAMMOND BAG & PAPER CO.**  
Paper Mill and Bag Factory . . . Wellsburg, W. Va.

## LIME HYDRATE PLANTS—

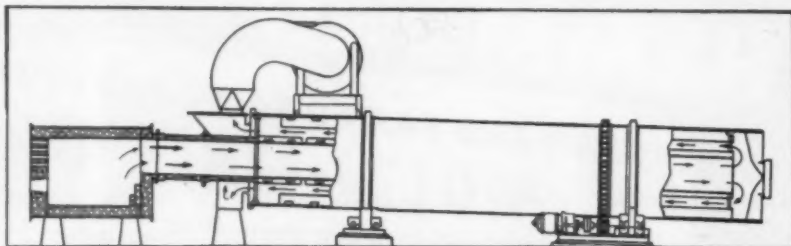
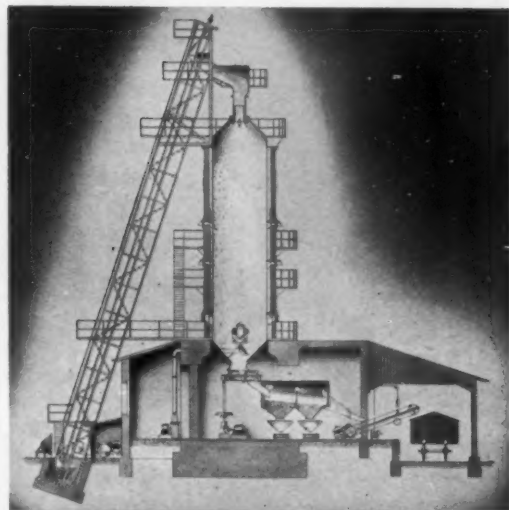


*Stop that loss... Save lime fines*

**KUNTZ GRAVITY SYSTEM OF LIME HYDRATION**—Provides absolute control of the hydration process in a single unit. Saves up to \$1.50 per ton because patented dust control stops all loss of lime fines. Heat of hydration, often wasted, is used to heat water applied to hydrator. The only automatic system of one-man operation giving 100% control of quality and uniformity. Batch or continuous method. Can be applied to any type of hydrate plant.

**YORK DOUBLE SHELL DRYER (Lower Right)** — High thermal efficiency and the resulting economy of operation of the York Dryer is unsurpassed. Double shell allows hot gases to dry and pre-heat the stone by radiation. Gases absorb moisture in inner flue, completing the drying process. Result: high fuel efficiency with resultant fuel economy.

**YORK-KUNTZ AUTOMATIC VERTICAL LIME KILN (Above)**—Here's an automatic kiln that eliminates crushing and assures continuous control. Result: a uniform burn that reaches the absolute peak of fuel efficiency. Features: either mixed feed, coal or gas firing; continuous discharge and continuous feed; adjustable distribution; center load support; center combustion control.



OTHER MCGANN PRODUCTS — LIME PLANTS COMPLETE • HYDRATORS • SHAFT KILNS • ROTARY KILNS • DRYING MACHINERY • TANKS • BINS • GREY IRON CASTINGS • SUGAR MACHINERY • SPECIAL MACHINERY FROM ENGINEER'S DESIGNS

# LIME & HYDRATE PLANTS CO.

*Associates* MCGANN MANUFACTURING COMPANY, York, Pa.



## TYPICAL DIESEL LUBRICATION PROBLEMS:

### 3. Ring-Sticking

Ring-sticking usually results from deposits formed by the combination of the residues of oxidized lubrication oil and fuel with fuel soot.

In four separate ways, RPM DELO prevents the formation of these deposits:

1. RPM DELO is manufactured from a carefully selected base oil containing natural inhibitors highly resistant to oxygen. It contains no heavy residues which may be left behind to act as a binder for the fuel soot.

2. RPM DELO contains an added oxidation inhibitor which greatly reduces the rate at which the oil absorbs oxygen.

3. RPM DELO has chemical detergent properties. The compounding material reacts with the oxyacids to render them essentially inert so that they are no longer able to polymerize to form gums and lacquers.

4. RPM DELO has peptizing properties which enable it to maintain soot and oxidation products in suspension in minute particles. This prevents these materials from settling from the oil and forming engine deposits.

RPM DELO, moreover, is non-corrosive to all types of bearings, does not foam and has very high metal adhesion qualities at both high and low temperatures.

RPM DELO is marketed throughout the United States and many foreign countries under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial-RPM DELO (concentrate).

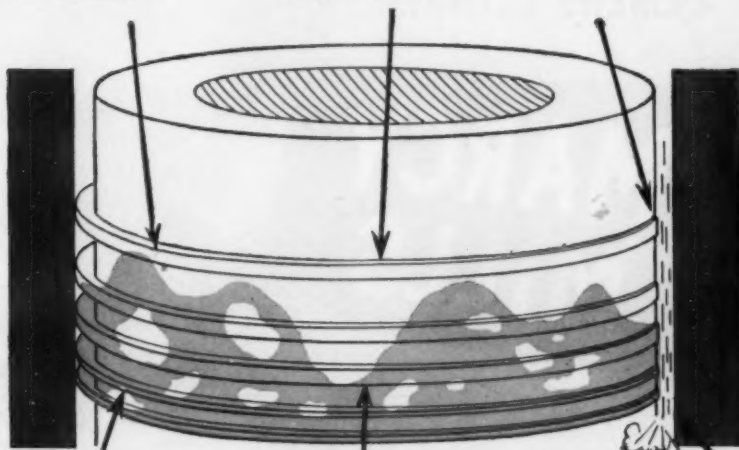
☆ ☆ ☆

### HOW RING-STICKING OCCURS

Decomposition products of fuel and lubricating oil deposit in ring groove, behind ring and in side-clearance space.

Rings stick in grooves, no longer expanding to form tight seal between piston and cylinder wall.

With seal broken, hot, high pressure gases "blow-by" stuck ring.



Escape of gases reduces compression, overheats piston, increases oil deterioration.

Blow-by pressure removes lubricating oil from rings and cylinder, leaving dry spots.

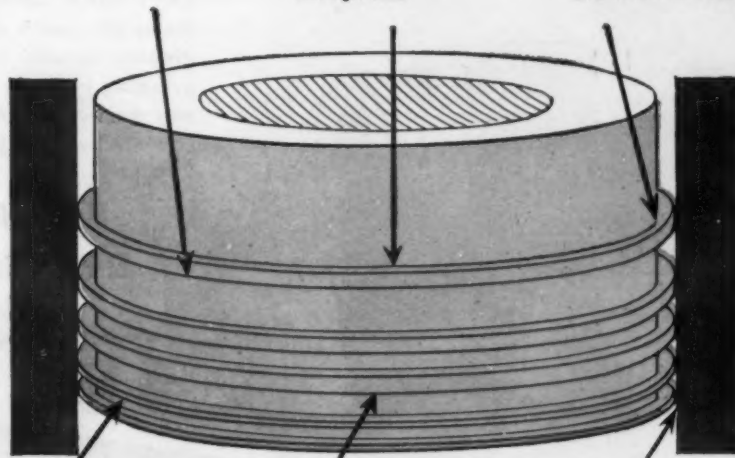
Loss of lubrication results in high ring and liner wear and scratching.

### HOW RPM DELO PREVENTS RING-STICKING

Detergent in RPM DELO prevents deposition of oxidation products.

Ring grooves are kept clear, allowing ring tension to maintain tight seal.

RPM DELO clings to ring surface, maintaining lubricant film and seal.



Tight seal eliminates blow-by, maintaining compression and power.

RPM DELO adheres to hot surfaces, protecting entire surface of rings, piston and liner.

RPM DELO lubrication results in minimum ring and liner wear, eliminates scratching.



## STANDARD OF CALIFORNIA

# LOW PULP LINE

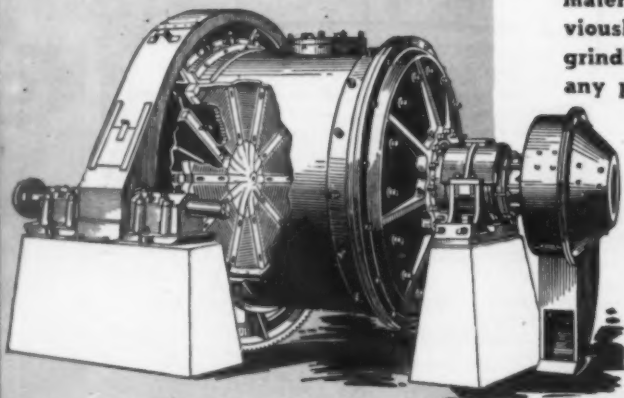
for GRINDING  
CEMENT CLINKER

## MARCY MILLS

**L**OW DISCHARGE, made possible by the Marcy grated open end, effects quicker removal of finished material. Due to quick discharge of material when finished, grinding balls work on a smaller body of material and are cushioned less — resulting in more useful work from the grinding media.



For PRIMARY GRINDING of cement clinker, or any like materials, quick removal of the finished product obviously results in increased capacity and lower grinding cost per ton . . . both desirable objectives in any postwar planning. Postwar construction **MUST** be a big job. Let us help you get ready for it.



Main Office: Denver, Colorado, U. S. A.  
El Paso, Salt Lake City, 1775 Bdway., N.Y.  
Canadian Vickers, Ltd., Montreal  
W. R. Judson, Santiago and Lima

Genuine Wilfley Tables; Massco-McCarthy Hot Millers; Rock Bit Grinders; Density Controllers; Belt Feeders; Pinch Valves; LABORATORY EQUIPMENT; MINE & MILL SUPPLIES; COMPLETE MILLING PLANTS.

## The Mine & Smelter SUPPLY CO.

what is  
**"RELAXED"**  
wire rope...?

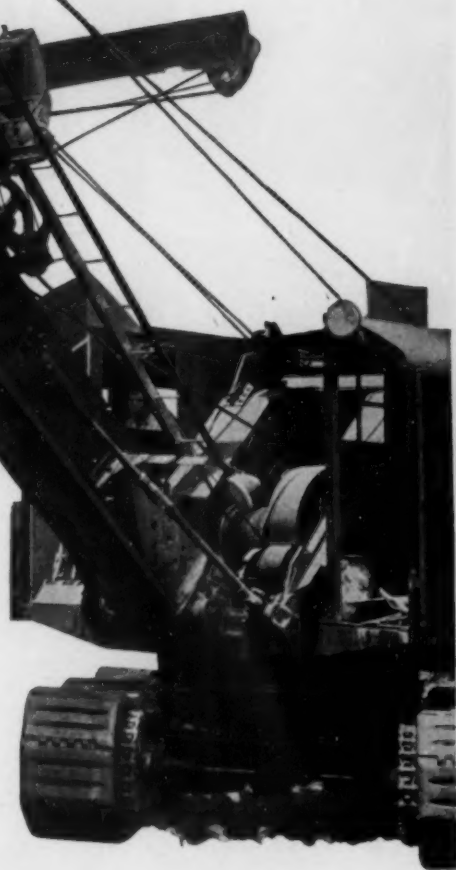
**E**very time you run a length of non-preformed rope over a small sheave or drum, you create a high degree of bending fatigue that shortens the life of the rope.

In contrast, when you use Bethlehem Form-Set in your clamshells, derricks, cranes, and power shovels, you've got rope that's "relaxed" because it's been made by the preforming process. Form-Set Rope is flexible ... unusually free from built-in torsional stresses.

Where it is necessary that sheave and drum ratios be small, these characteristics are especially desirable, for they mean smoother spooling, longer rope-life, smaller maintenance costs, and a lot less trouble-shooting.

Besides the Form-Set feature, you'll want Bethlehem's Purple Strand grade of rope for lifting and earth-moving work. Purple Strand is Bethlehem's top quality—made of improved plow steel—and that means it's as fine a rope as you can buy anywhere.

**When you think WIRE ROPE**  
**... think BETHLEHEM**



**YOUR LINK-BELT SPEEDER HAS GONE TO WAR—  
ON FRONTS ALL OVER THE WORLD!**



Link-Belt Speeder Zephyrcrane  
operating in plate shop area.



These steel gratings are used  
for tanker runways and catwalks.



Link-Belt Speeder loading mate-  
rial on tanker at outfitting docks.

**LINK-BELT SPEEDERS ON**  
IN MARINSHIP CORP. YARDS AT SAUSALITO, CALIFORNIA

**HEAVY-DUTY WORK**

Buy  
More  
Bonds and  
Hold Them  
Until  
Maturity!

**LINK-BELT SPEEDER**

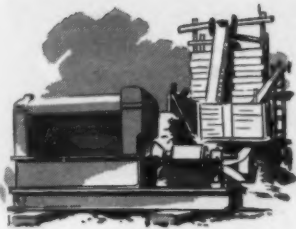


*Builders of the Most Complete Line of*  
**SHOVELS-CRANES-DAGLINES**



LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO-9, ILL.  
(A DIVISION OF LINK-BELT COMPANY)

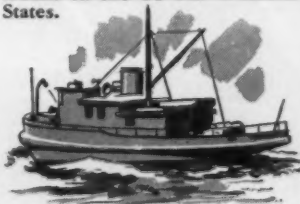




In rock crushers, dredges, draglines and various other types of heavy-duty material handling equipment, rugged, economical and dependable Cummins Diesel power has been a major factor in increasing production—reducing production costs.



Late in 1932, the world's first heavy-duty, diesel-powered freight truck went into service. The engine was a Cummins Diesel. Today, Cummins Diesels power approximately 90% of all franchise-operated, long-line, heavy-duty, diesel-powered trucks in the 11 Far Western States.



The world's first fully enclosed type marine diesel—now an accepted feature of marine engine design—was built by Cummins in 1928. Cummins Marine Diesels power fishing boats, work boats, pleasure craft and, today, many boats designed for the armed services.



Four Cummins Diesels, three of them seven years old, powered the rig which this year drilled the world's deepest oil well. In this and many other heavy-duty services—logging, construction, and material handling—Cummins Diesels draw the tough jobs.

Automotive models • marine engines for propulsion and auxiliary power • power units of all types • stationary engines • generating sets locomotive models

## The End is Not in Sight

Even a casual comparison of the massive, lumbering diesel of yesterday with a trim, compact, modern-day Cummins Diesel will show that the diesel engine has come a long way in the 26 years that Cummins has been in the business. Yet, the end is not in sight because the same kind of thinking that led to Cummins' development of the original high speed diesel more than a decade ago promises still greater achievements in power efficiency tomorrow. This thinking is characterized by its refusal to become "set in its ways" . . . by its determination to fully explore every possibility for improving design, construction and materials . . . every possibility for giving you still more horsepower per pound and still more profits on your job through high speed diesels. CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.



# Correct Lubrication

## MEANS BETTER MAINTENANCE



• Very often, *correct* lubrication is the remedy for difficult maintenance due to excessive wear.

For *correct* lubrication of **QUARRYING MACHINERY**, Sinclair provides highly specialized Oils and Greases...lubricants with wear-preventive qualities that help keep maintenance and

replacement costs down. Sinclair Ten-ol 200 is especially efficient for Diesel engines and Diesel-powered shovels, buckets, and bulldozers.

• • •

(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)

## SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.



**KEEP  
PLENTY  
OF AIR  
"ON TAP"**

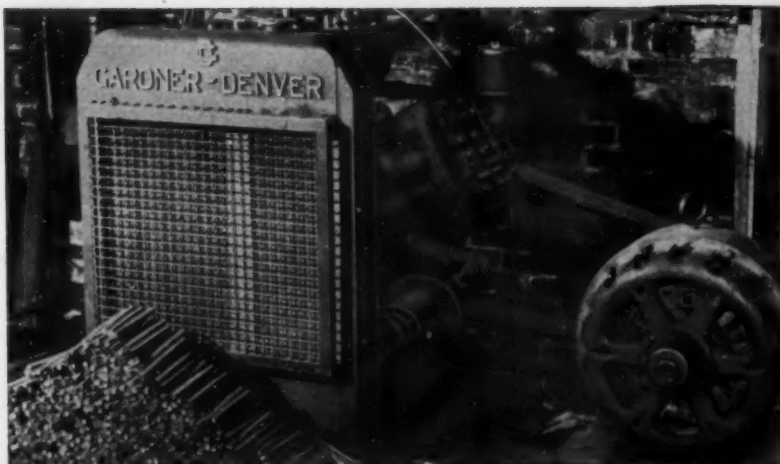
*for all vital  
needs*

**T**HERE's always air for every purpose  
—if your compressor is a Gardner-  
Denver.

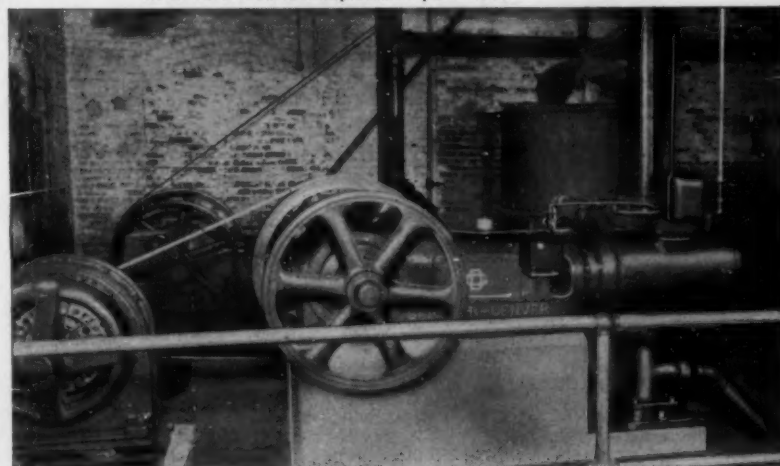
For these dependable compressors are  
designed to furnish a consistent supply  
of compressed air, regardless of the  
severity of service . . . to have plenty of  
air on hand for rock drills, sinkers,  
breakers, spaders and all your air tools  
at all times.

The rugged construction of Gardner-  
Denver compressors with vital parts  
cast in GarDurloy and Timken roller  
main bearings means low maintenance  
and long life.

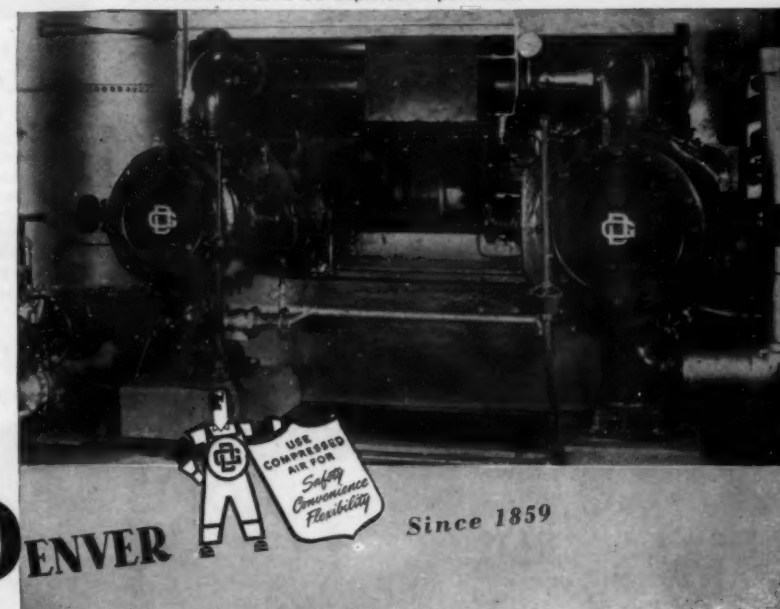
For complete information and specifications on  
Gardner-Denver compressors, for permanent  
or semi-portable installation, write Gardner-  
Denver Company, Quincy, Illinois.



Gardner-Denver "WB" Vertical Two-Stage Water-Cooled Compressor. Capacities range from 142 to 445 cubic feet displacement per minute.



Gardner-Denver "RX" Single-Stage Horizontal Compressor. Capacities range from 89 to 1292 cubic feet displacement per minute.



Gardner-Denver "HA" Two-Stage Horizontal Compressor. Capacities range from 316 to 2012 cubic feet displacement per minute.

**GARDNER-DENVER**



Since 1859



*ONE of these*  
**GATES V-Belts**  
*Will Fit ANY NEED*  
*You May Have!*

If you have a drive on which V-Belts of special construction may be required for greatest service efficiency, you will almost certainly find that Gates has long been building a V-Belt precisely engineered to fit your special needs.

On some installations, for example, a V-Belt, the tension member of which is composed of rayon cords will have advantages over the standard cotton cord construction. Gates has been building Rayon-Cord belts since 1939.

Again, Gates Rubber Engineers have found that a belt built with flexible steel cables as the tension member is sometimes most economical despite its higher initial cost—and Gates has been building flexible Steel-Cable V-Belts since 1935.

For more than six years, the Gates Synthetic Rubber belt has been making amazing service records in large industrial plants all over the United States. Under severe conditions of heat and oil the Gates special Synthetic belt actually wears 2 times to 3 times as long as any natural rubber belt ever used.

It might seem that it would be some trouble to determine whether a synthetic-rayon, a synthetic-steel-cable, or a standard Gates Vulco Rope would be most efficient and economical for your particular application. Actually, this involves no more than picking up your phone.

There is a Gates Rubber Engineer in every industrial center. A phone call will bring him to your plant. He is a specialist in drive operation. He is completely informed on the nature and advantages of every type of belt. He will always recommend the practice that will be most efficient and economical for you

**Rayon Cord**

V-Belts

**Static-Safety**

V-Belts

*Special* **Synthetic**

V-Belts

**Cotton Cord**

V-Belts

**Steel Cable**

V-Belts



**In one of the World's  
 LONGEST TUNNELS**

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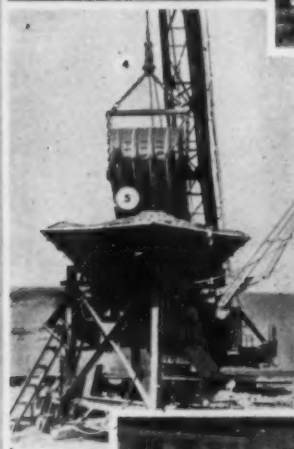
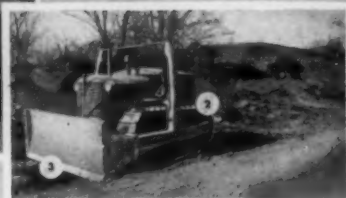
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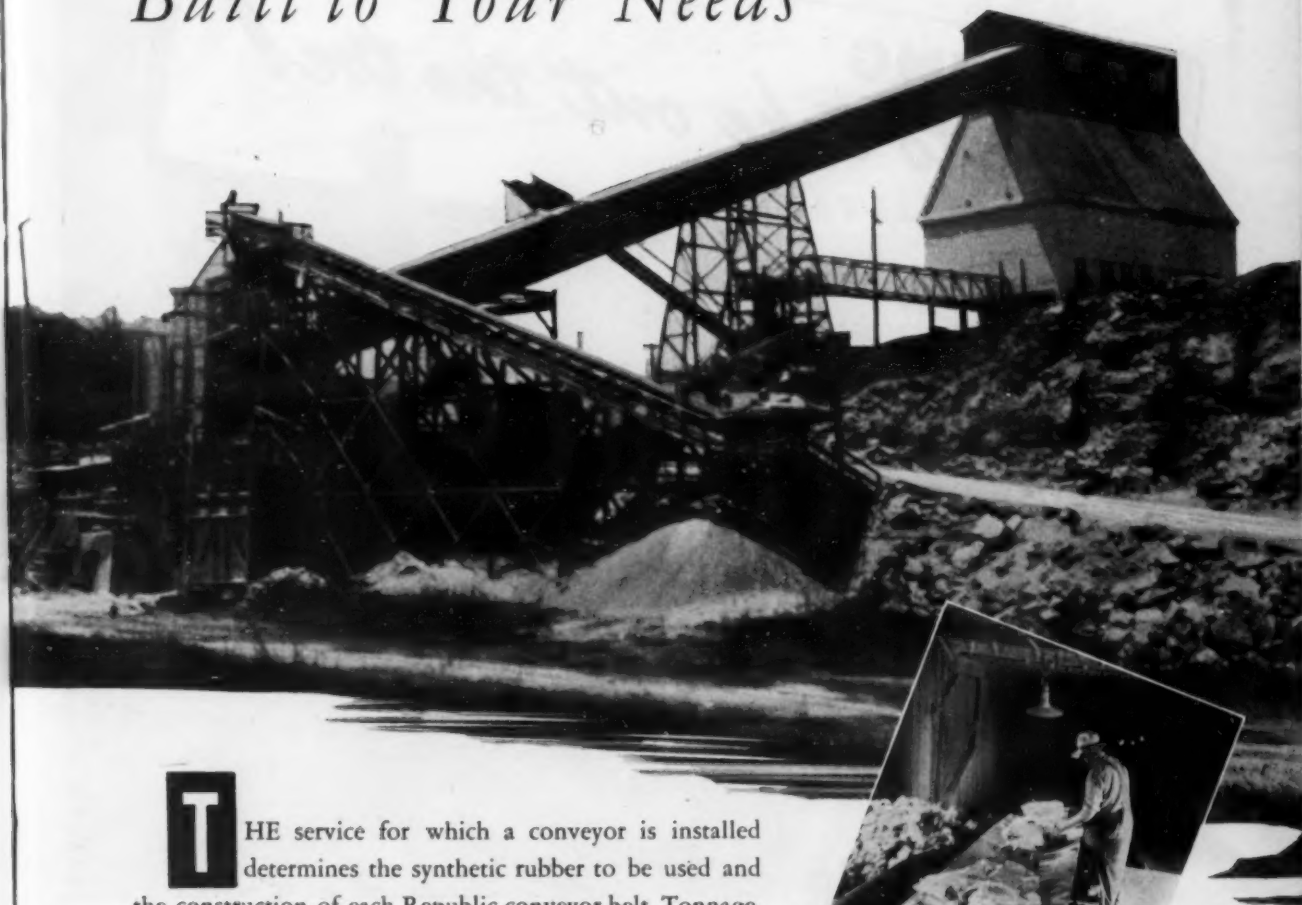


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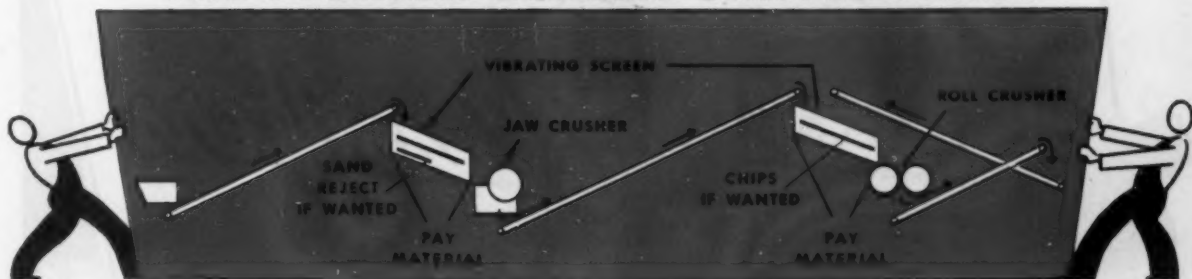
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# BOTTOM DECK FEED *Produces more!*

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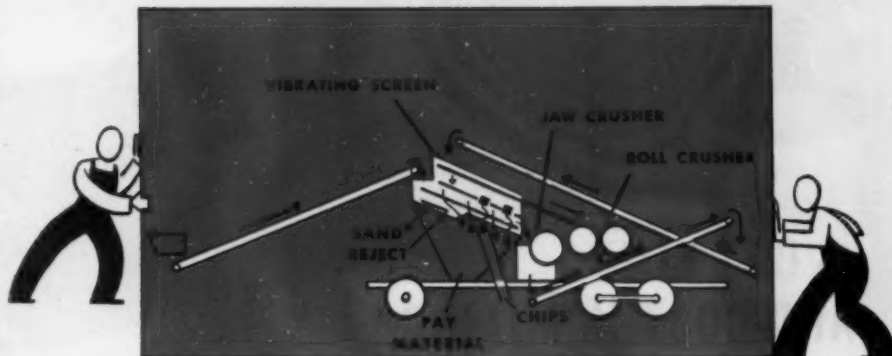


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### Here are the advantages of the Bottom Deck Feed:

**1** Doubles the screen area producing pay material. Both top and bottom decks produce pay material.

**2** Increases crusher output. The work of both crushers is balanced by opening or closing jaw crusher, thus keeping

both crushers working to maximum efficiency and capacity.

**3** Crushed material is not mixed with pit run material on screen.

**4** "Stone Chips" can be produced without additional equipment.

*Pioneer "Bottom Deck Feed" Gravel Plants are built in five sizes for every gravel requirement. There is one size that will answer your problem. Let us show you the advantages on your specifications.*

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## AKINS *Classifiers*



**to CUT TIME  
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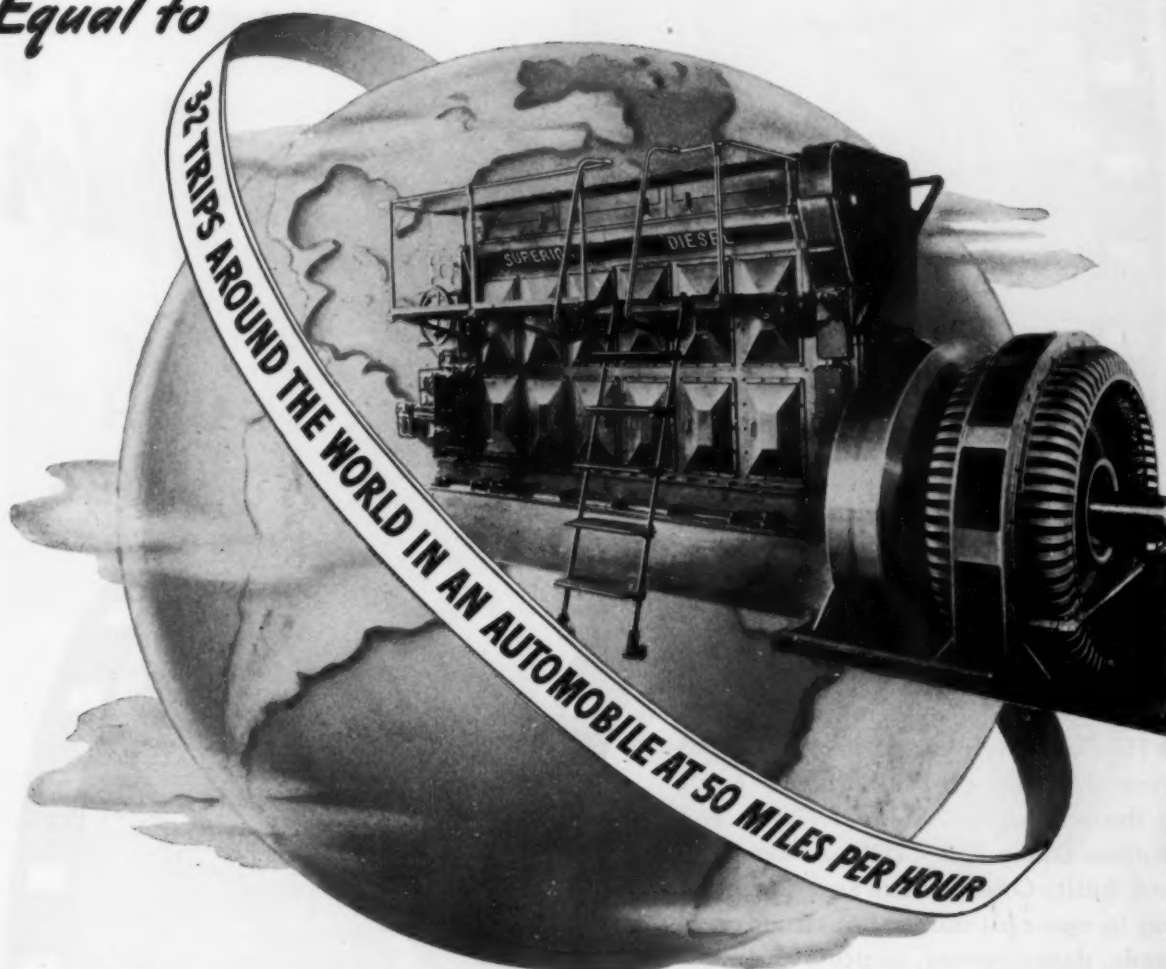
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"Nuts," I used to say to this Mack salesman. "I should pay you more for a truck when I can get another kind cheaper? So what if it ain't as good? I run the hell out of it—then I buy me a new one. That way I'm ahead of the game and I always got a new truck, see?"

I was a smart apple, I was. Yeah.

Now look at me—right behind the eight-ball. Sure I still got a truck and I'm stuck with it for the duration! What that junkheap is doing to me shouldn't happen to Hitler.

And that ain't all. That brother-in-law of mine, Benny, he bought a Mack 'way back, and he ain't letting me forget it for a minute.

You shoulda heard him last night. "Just like I always say," he crows. "You pays your money and you takes your choice. Now you take that Mack of mine. That baby's been over a hundred thousand miles and I ain't had the case down yet. Never missed a trip, and what's more, the way she's running, I know I ain't going to!"

Personally, I still think somebody dropped Benny on his head when he was a baby. But here lately, I'm beginning to think it didn't do him no harm.



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ROCK PRODUCTS, August, 1944

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Representative of what Universal-equipped plants are doing for their owners and for the good of the country is the plant of A. R. Alvis, West Plains, Missouri, which is shown above averaging 250 tons of aglime per 8-hour day with fuel cost, including two quarry trucks and two 105' air compressors for drills, approximating \$18.08. Plant consists of apron feeder, 18" x 24" Universal Roller Bearing Primary Jaw Crusher set for 2" opening, 4' x 12' 2-deck vibrating screen and hopper, Universal No. 3 Pulverizer and Rotovator and conveyors. This operator has contracts for 35,000 tons this season and is doing a considerable daily cash business besides.

When postwar road building and repairs "get the green light," it will only be necessary to change the screens and the manganese steel grates to produce 1" to 1½" material.

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617 C Ave. W., Cedar Rapids, Iowa



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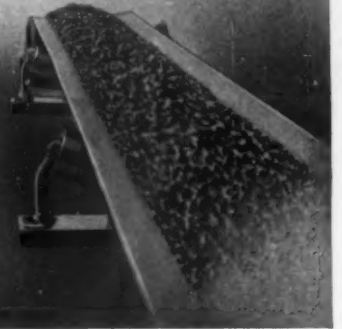
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"Thomas Robins was the pioneer of conveyor-belts . . . (He) revolutionized the conveyor-belt design . . . He developed the idea of idler pulleys and the troughed-shape belt... This idea was the best fundamental conception of a conveyor-belt"



**W**HEN THOMAS ROBINS introduced the rubber-covered, trough-shaped Conveyor Belt in 1891, it proved to be the opening of a new industrial era. Before the Belt Conveyor, quantities of raw materials—in mines, quarries, gas and cement plants—were handled in hundreds of tons per day. But with this invention, plants were erected which produced thousands of tons per hour.

When it was cumbersome and costly to handle materials, only the highest grade ores were mined. With the advent of the Belt Conveyor, it became possible and economical to utilize the low grade ores as well. Other minerals and materials which could not be handled by any other means became useful additions to the industrial economy.

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With the Belt Conveyor, a single plant produces 1,000,000 tons of washed and sized limestone a month; a coke plant stores and handles 1,000 tons of coal an hour; a shipping pier unloads 6,000 tons an hour; a collier puts ashore her 10,000 ton cargo in five hours with only three attendants—and no shore-based equipment.

Without the Belt Conveyor, mass production might never have been achieved. Without Robins and its pioneering ingenuity—which created 41 "firsts" in a single decade—many materials handling problems might still remain unsolved. Solving difficult materials handling problems has been a Robins habit for half a century. Perhaps you face one now. Submit the facts to Dept. R.P.8 for an impartial, non-obligating analysis.

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FOR MATERIAL AID IN MATERIALS HANDLING . . . . . **It's ROBINS**

**MATERIALS HANDLING MACHINERY**



## Cement Industry Must Solve Problems

**C**ONDITIONS under which the portland cement industry has been obliged to function during the last few years—extremely high wage levels, unfavorable fuel costs as well as power costs and a generally difficult labor situation—will dictate to a considerable measure the course the industry will follow in its post-war mill operations.

Production costs have gotten out of line and the industry desires to hold cement prices at favorable levels relative to competitive building materials. The mill of the future must be flexible enough to manufacture five or seven types of portland cement economically and should be designed in anticipation of variations to standard specifications as yet unknown. At this moment, the industry is seriously considering means to reduce its operating costs and, admittedly, many cement company executives are withholding definite plans to see what course other concerns follow.

There is much talk about the pros and cons of new long kilns with independent steam generating power plants as compared to existing shorter kilns and waste heat power plants, and other reconversions of considerable magnitude. Such contemplated investments would amount to a complete turnabout in methods, which some executives hint is bound to come.

Cement companies with plenty of money would prefer to replace outmoded mills with complete new equipment, following the lead of the big cement corporations which rebuilt certain of their mills just before the war. Designs for new mills, or new mill departments will be patterned after these newer plants. Even executives of small companies admit that the Northampton, Penn., plant of the Universal Atlas Cement Co. may have the right ideas for cement manufacturers to follow.

This mill has the flexibility to manufacture cement to meet most any specification, a point of great interest to operating executives. No one can be certain what "special" specifications the early future may bring. Features of design in various departments at Northampton can well be applied by less wealthy concerns which may be obliged to do their rebuilding and modernization piece-meal.

Certain companies which decide to replace outmoded plants will of necessity rebuild piece-meal so that they may continue to satisfy their stockholders by paying dividends. The thing to guard against in such a program, is excessive labor cost when the plant is finally completely rebuilt. In the past, concerns with outmoded plants have found the practice to be false economy. After investing hundreds of thousands of dollars, they still had an old plant with a labor cost which would be prohibitive at the now prevailing rates for labor. It is necessary that all principal operating departments be integrated into a unified plant, to achieve the acme of operating economy.

The expected return to the five A.S.T.M. types of cement will present no serious new problems but the air-entraining cements will, though not necessarily in manufacturing processes. There still remain a lot of problems to be solved in connection with air-entraining cements, but regardless, there will be a lot of it used for pavement construction.

Highway engineers are interested in durability of concrete more than anything else, and many of them are reluctant to sacrifice much compressive strength to get the advantages which air-entraining cements are supposed to give. Many purchasers of cement have gone so far as to suggest that cement manufacturers "guarantee" these new cements.

### Research's Part

Problems such as these suggest that the industry itself institute an expanded program of research and technical service to its customers. No doubt they constitute one of the problems the president of a leading cement company had in mind when he wrote us:

"Certainly one thing that should engage the attention of the top executives in the industry is a greatly accelerated program of research and scientific investigation to determine what makes cement behave as it does and how to apply this knowledge in the improvement of their product.

"There is every reason why the cement industry should assume leadership in this field, and, in so doing, largely supplant many current individual efforts to bring about improvements for specific uses."

Too many variables, mostly beyond the control of the cement manufacturer, enter into concrete construction for him to "guarantee" an air-entraining cement. Many users and contractors are not technically-minded enough to properly mix and place concrete made from this cement. And many don't know how to handle any cement properly.

The big multiple-plant cement companies have their service departments to educate the users of portland cements. To these concerns it is not enough to put on the market an acceptable product. The important thing is to help the customer to get *good concrete*.

With the new air-entraining cements coming into widespread use, this may be the time for smaller cement concerns to consider establishing technical service departments. A company with a single plant in the East recently had a bad experience on a big project because a ready-mixed concrete firm failed on principles. A complete research laboratory is to be built and high-calibered technical men engaged to service such projects in the future.

*Bror Nordberg*



## Groundwork for Air Power

**B**ATTERIES of Tournapulls, dozers, scrapers almost overnight transform the rough terrain of invaded areas into emergency flying fields. This high-yardage dirt moving needs the rugged power of *heavy-duty* engines.

To maintain continuous, hard-hitting performance of Diesels and heavy-duty gasoline engines, contractors everywhere have found definite help through *effective* lubrication...Texaco.

*Texaco Ursa Oil X\*\**, for example, is an additive type heavy-duty oil that is both detergent and dispersive. Its detèrgency keeps piston rings free and engine parts clean. Its dispersive ability holds deposit-forming ma-

terials in suspension until drained at oil change. *Ursa Oil X\*\** protects alloy bearings and prevents scuffing of rings, pistons, cylinders.

For quieter-running, longer-lasting transmission and differential gears, use Texaco gear lubricants.

Texaco lubricants have proved so effective in service that they are definitely preferred in many fields, a few of which are listed at the right.

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★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

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★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.



# TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN THE TEXACO STAR THEATRE EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

# **NEWS**

**R**ESTRICTIONS on the sale of 26 types of construction equipment were removed by the War Production Board on July 24, and other changes were made to decrease paper work in the administration of Order L-192, controlling the manufacture and distribution of construction machinery and equipment and repair parts. The 26 types of equipment are transferred from Schedule A of the order to Schedule B. Items listed in Schedule A may be sold to war agencies without restriction and to other purchasers only upon specific WPB authorization. One item, carrying and hauling scrapers with more than 15 cu. ft. capacity, has been removed from Schedule D, which lists items that may not be manufactured. These scrapers are now included in Schedule A. This change has been made to take care of a growing demand for large scrapers in mining operations. Items listed in Schedule B may be sold only on orders rated AA or better. This provision is effective August 3.

The 26 types of equipment that have been transferred from Schedule A to Schedule B are: Angledozer and modifications (for mounting on tractors of 25 drawbar H.P. or less); contractors' rotary brooms; concrete buggies and carts (hand operated and power propelled); bulldozers and modifications (for mounting on tractors of 25 drawbar H.P. or less); concrete handling chutes; concrete surfacing machines, highway type; construction material conveyors, portable belt type and for portable plants; contractors' and material handling derricks, guy and stiff leg stationary type; road discs, wheel mounted and harrow type for construction work; blade ditchers; rock drilling machines and modifications, hand held or portable mounted (except electric coal and core drills); self-propelled fine-graders and subgraders; finishers and rodding machines for wet concrete; concrete road forms; graders, under truck type; grapples, rock type; pile hammers; portable concrete hoppers; aggregate pulverizer mixers; cable-laying plows; snow plows (for mounting on tractors of 25 H.P. or less); road rippers; rollers, tamping and sheepfoot; scarifier, complete machines, not attachments; concrete placing and material elevating towers, and logging wagons (wheel type).

## Truck Rationing to ODT

Effective July 1, 1944 under ODT General Order 44, the rationing of new trucks and other commercial motor vehicles has been turned over

by WPB to the Office of Defense Transportation. It is expected that this change in the rationing machinery will result in more expeditious handling of applications for new trucks and other commercial motor vehicles. Under the WPB 1944 truck production program, approximately 89,000 medium and heavy trucks will be made available, as manufactured, to civilians in the United States through the ODT. As in the past, all applications for new trucks must establish the necessity for the vehicle in essential war transportation.

## Clarify Extension of Preference Ratings

War Production Board rules governing the application or extension of preference ratings have been clarified with the issuance of Interpretation No. 13 to Priorities Regulation No. 3.

When a preference rating is being applied, other than a blanket rating such as one assigned by Controlled Materials Plan Regulation No. 5, or when any rating is being extended for some purpose other than to replace inventory, it may be done only within a reasonable time after the rating was received. The general rule, according to Interpretation No. 13, is that more than three months is deemed to be an unreasonable delay in the use of a rating. However, in particular cases there may be circumstances which make a reasonable time shorter or longer than three months, WPB said.

The interpretation points out five specific cases to illustrate the application of specific circumstances to modify the general rules:

1. A rating assigned to a construction project on a form which indicates when a rating expires may be applied for material going into the project until the stated expiration date, even though more than three months may have elapsed. Such ratings are assigned on forms such as GA-1456 or CMPL-593.

2. A rating assigned in connection with an export license may be applied as long as the license is valid and expires when the license expires or is revoked. (For explanation of this rule see Interpretation 2, Directive 27.)

3. When a rating is applied to a long term contract (such as the construction of a ship), it may be extended for material needed to fill the contract, even though more than three months have elapsed.

4. If the purpose for which the rating was assigned no longer exists, the rating may not be applied even though three months have not elapsed.

5. When a rating is extended by a person to get material to deliver to his customer, or to incorporate in such material, the time within which it may be done will, in general, be controlled by the delivery date on his customer's order.

The interpretation finally points out that the mere fact that a person has not been able to get his rated order accepted by a supplier does not lengthen the time within which he may use his rating.

## Southern Florida Stone, Block, and Ready Mixed Prices

Under Amendment No. 41 to Order No. A-1 of MPR 188, the OPA has modified producers' maximum prices for certain crushed stone aggregates, concrete block, and ready mixed concrete produced in southern Florida. Within a radius of 50 miles of the Dade County Court House, the following prices per cu. yd. have been set for Miami Oolite limestone:

Product	F. O. B. plant	Delivered to job site within Miami area
Crushed stone aggregates (gradation 1 to 11 inclusive) . . . .	\$1.10	\$1.85
Cover rock (gradation 12 to 15 inclusive) . .	1.30	2.10
Coarse aggregate, for hot mixed asphalt . . .	1.30	2.10
Pea rock (gradation 16 to 18 inclusive) .	1.50	2.35
Rock screenings, concrete and mason sands fine aggregates for cement concrete, for bituminous binder mixtures and for hot mixed asphalt . .	1.00	1.75
Lime road rock, grade No. 1 or grade No. 2 . .	.85	1.60

Maximum prices per cu. yd. for ready mixed concrete produced within a 15-mile radius of the Dade County Court House, shall be as follows:

Bags of cement per cubic yard of ready-mixed concrete:	Delivered to job site within the Miami area
4 . . . . .	\$6.30
4 1/2 . . . . .	6.65
5 . . . . .	7.00
5 1/2 . . . . .	7.35
6 . . . . .	7.70
7 . . . . .	8.40
8 . . . . .	9.10
9 . . . . .	9.80
10 . . . . .	10.50

Maximum prices for concrete block produced within a radius of 15 miles of the Dade County Court House, shall be as follows:

Size	Per block f.o.b. plant	Delivered within Miami area
8 x 8 x 16 . . . . .	\$0.0950	\$0.1150
8 x 12 x 16 . . . . .	.1650	.19
4 x 8 x 16 . . . . .	.0675	.0775
8 x 8 x 16 (corners and jambs) . . . . .	.0950	.1150
8 x 12 x 16 corners . .	.1650	.19
8 x 8 x 8 (single corners and half jambs) . . . . .	.0675	.0775
8 x 4 x 16 or 8 x 3 x 16 partition tile . . . . .	.0675	.0775

(Continued on page 158)



*You can't take one away from the other—the Steel, the Rope, the Men who make it, engineer it, and apply it to the drums and sheaves. They add up to rope service* ● **ROEBLING "Blue Center" STEEL WIRE ROPE**

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# Rocky's NOTES

## West Coast Survey

WHEN THIS was written I had just returned from a two weeks' trip which included Denver, Salt Lake City, San Francisco and Los Angeles, traveling in company with Vincent P. Ahearn, executive secretary of the National Sand and Gravel Association. The trip was made at the invitation of the West Coast members of the Association, that all producers in the localities visited might learn firsthand about the many activities of the Association and of its very capable secretary.

What made this trip particularly interesting to the writer is that it was reminiscent of a similar trip made nine-and-a-half years ago, when Vince Ahearn was functioning as secretary of the National Code Authority of the Crushed Stone, Sand and Gravel and Slag Industries. In February and March, 1935, we were out to "sell" the Code to skeptical producers. The N.R.A. did not last long after that, but the industries seem to have done very well for themselves without it. At least it proved the value of coöperation—and voluntary coöperation is far to be preferred to the N.R.A. kind. On the West Coast are now many of the staunchest members of the National Sand and Gravel Association.

A trip like this at this particular time impresses one most by the tremendous amount of war activity in the Far West. The Pacific Coast especially makes the Eastern visitor aware of the presence of war. The whole coast line from San Francisco to San Diego is just one military or naval establishment after another, many of them covering square miles rather than acres. And, because, the general opinion there seems to be that our military and naval establishments on the Pacific will be needed long after the Japs are whipped, California producers expect most of these bases along the coast to be permanent.

That will mean much in the way of business, both directly and indirectly. Of course, a good deal of present war industry will be much curtailed by the end of the war. In the course of our travels we visited the Kaiser shipyards in Oakland and the Consolidated-Vultee airplane factory in San Diego. No one expects

that peace-time production in plants like these will call for anything like that at present. California natives are none too happy about recent immigration into California of workers for these plants. For the first time in its history California will face a serious Negro problem, as well as an unemployment problem.

### Denver, Colo.

At Denver we found producers about finishing up local war construction. The post-war prospects are rather vague, except that the city will have one of the finest airports in the world. The military establishment there, or at least the airfield, will revert to the city, at the end of the war, and form an extension or addition to its already magnificent municipal airport. At the threshold of our American Switzerland, but a few hours flying time from all the big cities of the Middle West, Denver and Colorado seem destined to become the recreation center of the continent. However, Colorado is one of the few states that up to the present appears to have no very definite highway plans. Tapping this beautiful mountain country with access highways should prove profitable to all citizens of the state, even though construction is costly. The city of Denver itself aside from the military establishments seems to have had merely a normal growth.

An interesting sidelight on the post-war picture is the case of a large contractor who has sold practically all his equipment. One reason is that he believed it was oversize for any conceivable post-war project, and that changes and improvements might render it obsolete. He would rather start over again with a clean slate. I also found producers of sand and gravel who believe the post-war period may see some revolutionary improvements in machinery and equipment, although, apparently, this means only greater use of frictionless bearings and wear-resistant alloys.

### Salt Lake City

War construction in the Salt Lake Valley is definitely coming to an end. A big Federal Housing project now under construction will provide busi-

ness for the balance of the year, but completion of the new plant of the Columbia Steel Co. (subsidiary of the U. S. Steel Corp.) was the end of all the big stuff in sight. Something like three-quarters of a million cubic yards of concrete went into this plant, most of it for foundations. The plant was rolling steel plates when visited on July 15. There is some uncertainty as to whether this plant, which is actually owned by the Defense Plant Corporation, can be operated economically enough to stay in the post-war picture.

One interesting feature of the operation is the handling of the iron ore, which is not very uniform in chemical analysis. Ore from different parts of the mine is stocked in parallel piles, and the ore fed to conveyors which discharge to a blending conveyor at right angles to the others, very much as sand and gravel sizes are blended to make a specification aggregate. As we have pointed out in various articles, there may be places where blending of raw materials would be equally effective in the rock products industries in order to obtain a plant feed of some degree of uniformity.

### San Francisco

Apparently, except for shipbuilding, San Francisco Bay people expect their city to absorb most of its recent increases in industry and population. As the principal port in the United States on the Pacific Coast (Los Angeles friends, please forgive!) it should become one of the greatest in the world with the expected growth of commerce between this country and China, Russia and the Far East generally. Business in sand and gravel and ready-mixed concrete is being kept active among other things by repavement of airport runways to accommodate ships of the B-29 bomber class. It is said only concrete some 18 in. thick will bear the loads. Asphaltic type runways are out, when it comes to handling these big ships.

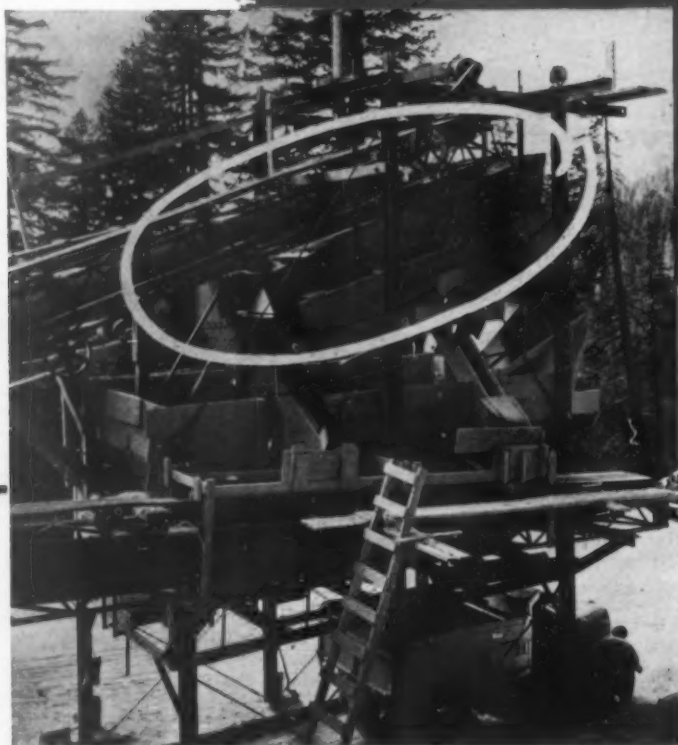
### Los Angeles

Nothing can down the enthusiasm of Los Angeles residents. This city might well be called The Concrete City, for, wherever the eye rests, magnificent concrete structures are seen. Nor is the end in sight. Extensive paving and grade separation, street and highway construction are in the post-war picture, but probably the biggest item is reconstruction of much of the present sewage system and construction of an immense sewage disposal plant. The city has grown so rapidly that it has far outstripped its present sanitary facilities.

*Nathan C. Rockwood*

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# News

## ABOUT THE INDUSTRY AND PEOPLE

### Accepts Construction Post

W. ALLEN GRUBB, district engineer for the Portland Cement Association, Seattle, Wash., has resigned his position to become associated with the American Pipe & Construction Co., Los Angeles, Calif., as a civil and hydraulic engineer. Mr. Grubb has been with the Portland Cement Association for the last 18 years and has been in close contact with public officials and construction leaders all of that time. Previous to his service with the P. C. A. he was in the city engineer's office for seven years and was acting district engineer when he left that office. The American Pipe & Construction Co., manufacturers of both steel and concrete pipe, has its headquarters in Los Angeles but handles heavy construction work, especially large concrete and steel pipe installations for water supply and sewer projects in the western half of the United States, Mexico and South America.

### Appointed Auditor

FRED H. PFROMMER has been appointed auditor of the Buffington plant of the Universal Atlas Cement Co., a subsidiary of the United States Steel Corp. He succeeds the late W. C. Ramsay.

### Marblehead Lime President

WALLACE E. WING has been elected president of the Marblehead Lime Co., Chicago, Ill., succeeding the late Bernard L. McNulty. He was recently made a vice-president, along with M. R. Mathews and R. A. Temple. Mr. Wing became associated with the



Wallace E. Wing

company shortly after its reorganization in 1922, and has served in various operating, technical and executive capacities since that time. He has been active in the work of the C-7 Committee on Lime in the American Society for Testing Materials and the American Chemical Society. No other official personnel were involved in this change.

### Injured in Train Wreck

W. C. HANNA, chief chemist and chemical engineer, California Portland Cement Co., Colton, Calif., received left leg and side bruises when the Santa Fe Chief was derailed near Flagstaff, Ariz., on July 4. Mr. Hanna was returning to California from the A. S. T. M. meeting in New York. In spite of his injuries Mr. Hanna did a heroic job of sawing and battering through wrecked bedrooms. He also was a member of the rescue squad that worked for four hours cutting a way through to the dying and critically injured in the Pullman.

H. D. JUMPER, specification engineer, Consolidated Rock Products Co., Los Angeles, Calif., also was a passenger on the wrecked Santa Fe Chief and assisted in rescue work.

### Survey Specialist

DR. GERALD F. LOUGHLIN, for the past nine years chief geologist of the Geological Survey, United States Department of the Interior, Washington, D. C., has accepted an appointment to the newly created position of special scientist in the Survey, and has been relieved of administrative duties in order to devote his time to research on special problems in the field of economic geology. Dr. Willmot H. Bradley, for the past two years in charge of the Military Geology Unit of the Geologic Branch, has been appointed Dr. Loughlin's successor as chief geologist.

### Christens New Diesel

TY BEESLEY, grandson of Donald M. Tyler, vice-president of the Dewey Portland Cement Co., Dewey Okla., christened the plant's new 45-ton Diesel electric motor recently in a ceremony in which a bottle of Dewey cement was broken over the new machine in the presence of a crowd of workmen and townspeople.

### Named Deputy Director

STEPHEN L. MATHEWSON, assistant director of the Cork, Asbestos and Fibrous Glass Division of the War Production Board, has been appointed deputy director of the division, to succeed the late George F. Stone.

### Elected Vice-President

JOHN H. MALLON, for the past five years sales manager of the Louisville Cement Co., Louisville, Ky., has been



John H. Mallon

elected vice-president. Starting with the company in 1920, when Brixment was in its infancy, Mr. Mallon has become known as one of the leading figures in the development and growth of the masonry cement industry, and as a recognized authority on mortar, brickwork and natural cement. His investigations and research on water-tight masonry have become a part of the building industry's accepted data on that important subject. As vice-president, Mr. Mallon will continue to direct the sales, advertising and promotion departments of the company.

### Engineering Specialist

R. S. CALKINS, formerly quarry superintendent of U. S. Gypsum Company's lime plant at Farnams, Mass., has resigned to accept a position as engineering specialist with the Soil Conservation Service of the U. S. Government, Clarion, Penn.

### Marquette Official Retires

F. L. JAEGER, vice-president, Marquette Cement Mfg. Co., Chicago, Ill., has retired from active service after spending 25 of his 33 years in the cement industry with Marquette, starting as a salesman in Iowa in 1919. He was sales manager at Memphis for 10 years and was then promoted to general sales manager with headquarters at Chicago. Later he was made a vice-president.



## Heads Carney Sales

N. A. HOLMER is now general sales manager of the Carney Cement Co. and the Carney Rockwool Co., with quarries and plants at Mankato,



N. A. Holmer

Minn. He was formerly director of sales and marketing for the Elastic Stop Nut Corp., Newark, N. J. Mr. Holmer will make his headquarters in the general sales office at 2478 University Ave., St. Paul, Minn.

## Represent Wolverine

MARC H. BIDEZ, well known in building materials circles, has been appointed by the Wolverine Portland Cement Co., Kalamazoo, Mich., as field representative in northwestern Indiana and the Chicago, Ill., area. Mr. Bidez is a native of North Carolina and obtained his high school and college training at the University of Brussels in Brussels, Belgium. His wide experience both as a seller and user of building materials will prove valuable to the company.

CHARLES MARTIN, who has been in the building materials field all his life, has been appointed to represent the Wolverine company in Indiana and Michigan. Mr. Martin has a sound understanding of the material man's viewpoint and has had experience in the field for two cement companies, and in the last 15 years has been local manager for several building material yards.

## N.H.A. Regional Changes

JOSEPH P. TUFTS, formerly regional representative of the National Housing Agency, Region VII, Kansas City, Mo., which has been closed, has been transferred to Region VIII with headquarters in Dallas, Texas, to replace Preston L. Wright, who is being moved to Region X, with headquarters in San Francisco, Calif. Mr.

Wright will succeed Eugene Weston, Jr., who has resigned to return to private architectural practice. The States of Missouri, Iowa, Minnesota, Nebraska and North and South Dakota will be added to Region VI, with headquarters in Chicago; Colorado and Kansas will be added to Region VIII, with headquarters in Dallas; Utah to Region X, with headquarters in San Francisco; and Wyoming to Region IX, with headquarters in Seattle, Wash.

## Resigns as Rubber Chief

BRADLEY DEWEY, head of the Dewey & Almy Chemical Co., Cambridge, Mass., has resigned as rubber director, effective September 1, and has recommended that the functions of his office be taken over by the War Production Board. War Mobilization Director Byrnes has indicated that he approved the plan and was recommending to President Roosevelt that he rescind the executive order that granted the rubber director special powers.

## U.S. Gypsum Transfers

PAUL BEEKMAN has been appointed assistant district manager of the United States Gypsum Company's Portland district office. George V. Lane, Portland, has been transferred to the Chicago office where he will enter the plant division. Mel Zahrl, Tacoma representative, will assume Mr. Lane's duties in Portland. Frank Hansen of the Seattle district is transferred to Tacoma. Keith Kimmerer is taking Mr. Hansen's place in Seattle, and Henry G. Smith of the Salt Lake City paint division is being transferred to Portland, Ore.

## Elected President

WILLIAM J. PRIESTLEY has been elected president of Electro Metallurgical Co., Electro Metallurgical Co. of Canada, Ltd., Michigan Northern Power Co., and Union Carbide Co. of Canada, Ltd., all units of the Union Carbide and Carbon Corp., succeeding the late Francis P. Gormely.

## Changes Position

V. W. PALEN, formerly with the editorial service of Westinghouse Electric Co., Pittsburgh, Penn., has joined the advertising-publicity department of North American Philips Company, Inc., New York, N. Y. Mr. Palen is a frequent contributor to the Hints and Helps columns of ROCK PRODUCTS.

## Resigns

JOHN F. VAN WAY has resigned as western advertising manager of *Pit and Quarry* to become sales representative of the Clearview Equipment and Mfg. Co., St. Louis, Mo. Mr. Van Way formerly was associated with

the George A. Fuller Co. as concrete plants superintendent. Prior to this he was advertising and sales promotion manager of the C. S. Johnson Co., Champaign, Ill.

## Yacht Race Winner

DUNCAN MEIER, Jr., vice-president, Ludlow-Saylor Wire Co., St. Louis, Mo., recently made the sport headlines as a member of the crew of the Bangalore Too, winner in the E. B. Lombard's B Class yawl race from Chicago, Ill., to Mackinac Island on July 18.

## Named on Board

SPEED HENDRICKSON, superintendent of the Ohio Valley Rock Asphalt Co., Summit, Ky., has been named a member of the Hardin County Selective Service Board.

## Illinois Plans Superhighways

HIGHWAY officials of Illinois are planning a post-war highway program to cost \$216,720,000 over a period of 10 years. Most spectacular of the plans will be the first superhighway across the state over U. S. 66, the Chicago, Springfield, St. Louis route. It will be a four-lane expressway, with two lanes in each direction divided most of the way by a parkway. Grade separations and other modern safety features will be incorporated in the high speed road which is to be connected with the Chicago southwest superhighway along the abandoned Illinois and Michigan canal bed.

According to Wesley W. Polk, chief highway engineer, the state is not abandoning its rural farm to market road program, but so far as the primary system is concerned all post-war emphasis will be on the main routes into the metropolitan centers which have been war time casualties of extra heavy loads on the bigger trucks. This means that future building will be concentrated around Chicago, with attention also being given the East St. Louis area and, to a lesser degree, such down-state centers as Peoria, Danville, Rock Island, and Rockford.

The state will spend this year some \$10,500,000 chiefly to rehabilitate heavily traveled routes, but full scale modernization must await the release of reinforcing steel and other critical materials. According to Mr. Polk, the state will continue to lay concrete pavements.

The City of Chicago has asked the state for \$237,700,000 to finance post-war superhighways, but the plans call for depressed rather than elevated roadways. These plans, however, are said to be only preliminary sketches and have not reached the planning stage.



## New Cement Plants for Mexico

UNDER the direction of the American-Mexican Economic Cooperation Committee plans are now being prepared for a chain of cement plants throughout Mexico. The plans, which have been approved by President Manuel Avila Camacho, are designed to produce cement for the construction of dwellings, hospitals, schools, roads and general public services. Plants will be built at the following locations: Hermosilla, Sonora, Mexico; Mazatlan, Sinaloa; Monterrey, Nuevo Leon; Leon, Guanajuato; Guadalupe, Jalisco; the federal district, Mexico City; Jasso, Hidalgo; Apasco, Mexico; Cuernavaca, Morelos; Puebla City, Puebla; Orizaba, Vera Cruz; Lagunas, Oaxaca; and Merida, Yucatan.

## Post-War Construction

F. W. DODGE CORPORATION reports a backlog of more than  $6\frac{1}{2}$  billion dollars in heavy engineering construction alone in the 37 states east of the Rocky Mountains awaits the end of the war. In the heavy engineering category, the Dodge organization groups streets and highways, bridges, dams and reservoirs, water front developments, miscellaneous public works construction, electric light and power, gas plants and mains, pipe lines, oil and gas wells, water supply systems, railroad construction, airports, miscellaneous utility construction and similar items. There also will be a substantial backlog of industrial construction, involving 1045 manufacturing projects, to cost \$164,201,000.

## Resume Operations

UNIVERSAL ATLAS CEMENT Co., Hannibal, Mo., plant, recently resumed operations, according to a statement by Superintendent R. E. Hoffman. The plant was closed in March with bins full.

LEHIGH PORTLAND CEMENT Co., stepped up operations at its Metairie Falls, Wash., plant by putting a second kiln into operation. This was necessitated by demands for cement on the Hanford project. Only one kiln had been in operation recently due to a labor shortage, particularly in the quarry.

## Plan Vault Factory

NORWALK BURIAL VAULT Co., Port Chester, N. Y., and the American Vault Co., plans to erect a new plant on Midland avenue on property purchased from the New York and Stamford Railway Co. Murray E. Stow, an officer of both companies, advises that plans for the new building will be completed soon and John Lowry, Inc., New York, N. Y., has been en-

gaged as the contractor to build what is claimed to be the latest plant of its kind in the country. The concrete burial vault company's main offices are at Glendale, L. I., and there also are plants in New Jersey.

## Yosemite Ceases Operation

YOSEMITE PORTLAND CEMENT Co., Merced, Calif., in operation for 18 years, has ceased operations. As previously reported, the plant and equipment was sold to Henry J. Kaiser Co. The machinery will be sent to Venezuela. A severance pay plan, giving employees a half month's pay for every year of employment by the company was approved by the stockholders and is awaiting War Labor Board approval.

## Sell Gravel Boats

BUFFALO GRAVEL CORPORATION, Buffalo, N. Y., has sold three of its sand and gravel dredges to the R. C. Huffman Construction Co., for use in work for the navy. The three vessels have been idle in Buffalo harbor for more than a year because of legislation restricting dredging operations in New York State waters.

## To Produce Agstone

SULLIVAN LIME Co., owned by B. W. Sullivan, Rogue River, and M. B. Jorgensen, Silverton, Ore., has set up an agricultural limestone plant at Rogue River, Ore., which will have a capacity of 300 tons a day. Price of the ground limestone in carload lots has been fixed at \$2.75 a ton.

## To Build Gypsum Plant

NATIONAL GYPSUM Co., Buffalo, N. Y., plans to erect a gypsum wall-board plant in the Canton section of Baltimore, Md. The city of Baltimore will construct a \$1,000,000 pier in Baltimore Harbor to serve the plant.

## Kaiser Enters Gypsum Field

STANDARD GYPSUM Co., Inc., San Francisco, Calif., has announced through its president, Sam A. Perkins, that a partnership arrangement has been made whereby The Henry J. Kaiser Co., will manage the gypsum company's properties which have extensive gypsum deposits along the West Coast. It is the plan of the Kaiser interests to manage production, handling and manufacturing facilities for the production of plaster and wallboard as well as development of gypsum agricultural products. Other activities will include manufacture of steel-framed prefabricated sections of houses and plastic cement, similar to stucco, for exteriors.

The Henry J. Kaiser Co., will take over San Marcos Island in the Gulf of California, production properties at Ludwig, Nev., and plants at Long Beach, Calif., and Seattle, Wash. A plant will be erected in the San Francisco Bay area for production of wallboard, plastic cement and prefabricated sections. This new venture ties in with Mr. Kaiser's construction, shipbuilding, cement, magnesium, and steel interests.

## FTC Asbestos Hearing

FEDERAL TRADE COMMISSION has charged certain companies with entering into a combination to fix prices for insulating materials. The companies listed in the complaint are as follows: Standard Asbestos Manufacturing Co., Chicago, Ill.; Keasbey & Mattison Co., Ambler, Penn.; Norristown Magnesia & Asbestos Co., Norristown, Penn.; Sall Mountain Co., Rockdale, Ohio; Plant Rubber & Asbestos Works, San Francisco, Calif.; and Acme Asbestos Covering & Flooring Co., Chicago, Ill., and 12 other petitioners.



Dual batching plant of Reed & Abee, Inc., Asheville, N. C., with a fleet of nine transit mix trucks lined up in front of the plant. Note unusual chute arrangement for dumping aggregates into plant bins. Chutes also may be used for reserve storage.

## New Fluorspar Unit

INTERNATIONAL MINERALS & CHEMICAL CORPORATION, Chicago, Ill., has opened a new plant known as the Gila, N. Mex., fluorspar operation near Silver City, N. Mex. This plant uses the "sink-float" heavy media separation treatment of fluorspar ore. The mill is a 300-ton unit built for the production of metallurgical grade fluorspar. This new plant was built under the direction of J. A. Barr, chief engineer of the company, and E. C. Anderson, chief engineer for the potash division of the company.

## Rules Against Gypsum Tax

GYPSUM WALLBOARD is not subject to the Washington State cement product tax levied by the State Board of Equalization, according to a recent 3 to 2 decision of the State Supreme Court. The Board of Equalization appealed to the supreme court after the lower court issued an order restraining it from collecting the tax on wallboard from the United States Gypsum Co., at Heath, Mont.

## To Make Superphosphate

FRANK KLOEFFER, Boise, Idaho, has been awarded the contract for the construction of the \$1,000,000 superphosphate plant at Pocatello. Phosphate rock from the Conda mine, owned by Anaconda Copper Mining Co., and sulphuric acid from the Garfield acide plant, will be used in the new enterprise.

## Gypsum for Agriculture

MIDLAND GYPSUM CO., has started construction of a \$75,000 plant at Cody, Wyo., for processing of gypsum for the use of agriculture. It is hoped to have the plant in operation by August 15. Officers of the company are: H. J. Adams, Oakland, Calif., president and sales manager; L. A. Bowman, Lovell, Wyo., vice-president and B. B. Thompson, Cody, Wyo., secretary-treasurer.

## Close Magnesium Plant

PERMANENTE METALS CORPORATION magnesium plant at Lathrop, Calif., has been closed and the plant turned back to the Defense Plant Corporation. The plant, costing several million dollars, started operation in June, 1942, producing magnesium under the silico-thermic process. The plant was a subsidiary operation of Henry J. Kaiser Co.

## Contract Awards

LOGAN & TAYLOR, INC., Portland, Ore., submitted the lowest of three bids to supply 6000 cu. yd. of cover rock to the city of Vancouver, Wash., with a bid of \$2.60 per cu. yd. Ross Island Sand & Gravel Co., Portland, Ore., bid \$2.70 a cu. yd., and H. B.

Klineline, Vancouver, Wash., bid \$2.75 a cu. yd.

## Loan Plan for "Heat-Sealing"

FEDERAL HOUSING ADMINISTRATION has advanced a plan to speed up "heat-sealing" of homes during the summer months to avoid a peak-season rush which, because of the manpower shortage, may seriously delay filling of orders. This is of particular interest to mineral wool producers and distributors. Under the plan many lending institutions

qualified to make FHA Title 1 loans up to \$2500 for insulating homes and installing heat controls and heating equipment are permitting borrowers to defer the first payment until November 1. The average loan is about \$400.

## Phosphate Pilot Plant

INTERNATIONAL MINERALS & CHEMICALS CORPORATION, Chicago, Ill., recently completed construction of a pilot plant for milling phosphate rock near Hall, Mont., in Granite County.

## Cement Production Lower

BUREAU OF MINES reports that there were indications in the portland cement statistics for May, 1944, that the rate of decline in activity of the industry was becoming less severe. Although production of 7,181,000 bbl. of finished portland cement was 42 percent below May, 1943, the rate of decline was unchanged from that in April, 1944, and was of less magnitude than the maximum rate—50 percent in January, 1944—reached in the long-term downtrend that started in February, 1943. Mill shipments of 8,784,000 bbl. during May, 1944, were only 27 percent below those in the same month of 1943. This rate of decline was the lowest of any month since May, 1943, and was considerably less severe than the maximum—45 percent in October, 1943—reached since the start of the downtrend early in 1943. The May, 1944, rate of decline was much lower than the 42 percent decrease noted in April and, although it may have resulted largely from a combination of unusual factors, it remains as a very favorable indication of a lessened rate of decline in demand for cement.

The following statement gives the relation of production to capacity, and is compared with the estimated capacity at the close of May, 1944, and of May, 1943:

	RATIO (PERCENT) OF PRODUCTION TO CAPACITY				
	May 1943	May 1944	Apr. 1944	Mar. 1944	Feb. 1944
The month...	59.0	35.0	32.0	29.0	29.0
12 months...	70.0	44.0	46.0	47.0	49.0

• SINCE January, 1944, ROCK PRODUCTS has been in complete cooperation with the War Production Board in conserving paper. In spite of a reduced paper allotment, the publication has been made more interesting; editorial leadership has been maintained, and advertising volume among reliable manufacturers has been increased, and we have released to date this year 12½ tons of our paper for critical war necessities. This has been accomplished by using high grade, but slightly lighter paper stock. *Save and share your copies of ROCK PRODUCTS!*

## COMING CONVENTIONS

**American Institute of Mining and Metallurgical Engineers, Annual Meeting, Pennsylvania Hotel, New York, N. Y., February 18-22, 1945.**

**Industrial Minerals Division, American Institute of Mining and Metallurgical Engineers, Meeting, Statler Hotel, Boston, Mass., September 27-29, 1944.**

**National Chemical Exposition and National Industrial Chemical Conference, Chicago Coliseum, Chicago, Ill., November 15-19, 1944.**

**National Ready Mixed Concrete Association, Semi-Annual Meeting, Board of Directors, Palmer House, Chicago, Ill., August 15, 1944.**

**National Ready Mixed Concrete Association, Annual Meeting, Hotel New Yorker, New York, N. Y., January 24-26, 1945.**

**National Sand and Gravel Association, Annual Meeting, Hotel New Yorker, New York, N. Y., January 23-25, 1945.**

**National Sand and Gravel Association, Semi-Annual Meeting, Board of Directors, Palmer House, Chicago, Ill., August 16, 1944.**

# Sand and Gravel Production

**Bureau of Mines report for 1942-1943 shows smaller decline than expected. Industrial sand division is booming from war demands**

REFLECTING the drop in construction volume, sand and gravel production in 1943 declined 23 percent below the record established in 1942. The Bureau of Mines reports that this is the first decrease recorded in almost nine years of increasing production. Over 90 percent of the output of sand and gravel is used in construction. A new record, however, was reached in the production and use of industrial sands. Production of sand and gravel totaled 234,064,000 short tons valued at \$152,793,000 in 1943 and 304,346,000 tons valued at \$188,500,000 in 1942. About 75 percent of the output was supplied by commercial plants and 25 percent by contractors and construction or highway maintenance crews employed by Federal, state, county and municipal governments.

Commercial producers reported 176,469,256 tons in 1943, 24 percent less than the 232,947,787 tons sold in 1942. Average value increased from 68 to 72c per ton. Most of the output of the commercial plants is used in building and paving or railroad ballast. This tonnage declined 27 percent from 211,687,165 tons in 1942 to 155,250,578 in 1943.

## Industrial Sand

In the industrial sand division, glass sand sales increased 10 percent to 3,971,931 tons averaging \$1.86 per ton in 1943. Leading producing states, in order named were West Virginia, Illinois, Pennsylvania, New Jersey, and Missouri.

Record tonnages of molding sand were used by the metal working industries in 1943, increasing 8 percent in tonnage with an output of 8,924,654 tons averaging \$1.36 per ton. This compares with 8,255,991 tons valued at \$1.30 a ton in 1942. Illinois, New Jersey, Michigan, Ohio and Pennsylvania were the leading producing states.

Production of grinding and polishing sand increased 4 percent, totaling 837,662 tons valued at \$1.71 a ton compared with 806,878 tons valued at \$1.69 in 1942. Illinois, Michigan, Pennsylvania, New Jersey, and Missouri led in production.

Increasing 7 percent in output, production of fire or furnace sand totaled 394,753 tons at \$1.37 a ton and 368,465 tons at \$1.34 in 1942. States leading in production were Ohio, Indiana, Pennsylvania, Illinois, and New Jersey.

Production of engine sand increased 12 percent in quantity with an output of 2,862,025 tons at 69c a ton and 2,559,008 tons at 68c in 1942. Pennsylvania, West Virginia, Indiana, Alabama, and Illinois were the leading producing states.

Output of filter sand was 158,555 tons valued at \$1.63 a ton, 10 percent less tonnage than the 176,833 tons at \$1.26 in 1942. States leading in production were New Jersey, New York, Wisconsin, Connecticut, and Texas.

Washed, screened, or otherwise prepared material supplied 152,788,204 short tons, 87 percent of the total commercial production. The average value was 77c a ton for prepared and 43c for unprepared sand and gravel.

Difficulties in the operation of trucks are reflected in a trend toward rail transportation. Of the total commercial production, 42 percent was shipped by truck, 49 percent by railroad, and 9 percent by waterway.

SAND AND GRAVEL SOLD OR USED BY PRODUCERS IN THE UNITED STATES, 1942-43, BY COMMERCIAL AND GOVERNMENT-AND-CONTRACTOR OPERATIONS AND BY USES

COMMERCIAL OPERATIONS	1942		1943		
	Short Tons	Total Value	Short Tons	Value Total	Avg.
<b>Sand:</b>					
Glass .....	3,622,487	\$ 6,784,427	3,971,931	\$ 7,376,566	\$1.86
Molding .....	8,255,991	10,745,552	8,924,654	12,093,670	1.36
Building .....	46,035,701	26,901,356	30,910,985	18,662,075	.60
Paving .....	33,307,106	20,035,796	23,439,936	14,304,867	.61
Grinding and polishing <sup>1</sup>	806,878	1,363,168	837,662	1,428,463	1.71
Fire or furnace .....	368,465	491,972	394,753	539,273	1.37
Engine .....	2,559,008	1,749,204	2,862,025	1,983,364	.69
Filter .....	176,833	223,137	158,555	258,547	1.63
Railroad ballast <sup>2</sup>	1,969,758	675,778	1,319,896	411,938	.31
Other <sup>3</sup> .....	1,698,134	1,345,823	1,461,977	1,180,190	.81
<b>Total commerc'l sand</b>	<b>98,800,361</b>	<b>\$70,316,213</b>	<b>74,282,374</b>	<b>\$58,238,953</b>	<b>\$0.78</b>
<b>Gravel:</b>					
Building .....	46,389,536	\$35,827,822	31,121,915	\$24,395,097	\$0.78
Paving .....	60,874,506	43,193,937	49,050,490	35,769,203	.73
Railroad ballast <sup>4</sup>	23,110,558	8,377,991	19,407,356	8,022,006	.41
Other <sup>5</sup> .....	3,772,826	1,711,310	2,607,121	1,476,862	.57
<b>Total comm'l gravel</b>	<b>134,147,426</b>	<b>\$89,111,060</b>	<b>102,186,882</b>	<b>\$69,663,168</b>	<b>\$0.68</b>
<b>Total commercial sand and gravel</b>	<b>232,947,787</b>	<b>\$159,427,273</b>	<b>176,469,256</b>	<b>\$127,902,121</b>	<b>\$0.72</b>
<b>GOV'T-AND-CONTRACTOR OPERATIONS<sup>6</sup></b>					
<b>Sand:</b>					
Building .....	3,482,000	\$ 2,018,000	3,187,000	\$ 1,757,000	\$0.55
Paving .....	5,089,000	2,109,000	4,584,000	2,267,000	.49
<b>Total govern'm't-and-contractor sand</b>	<b>8,571,000</b>	<b>\$ 4,127,000</b>	<b>7,771,000</b>	<b>\$ 4,024,000</b>	<b>\$0.52</b>
<b>Gravel:</b>					
Building .....	8,022,000	\$ 3,942,000	4,106,000	\$ 2,803,000	\$0.68
Paving .....	54,806,000	21,004,000	45,718,000	18,064,000	.40
<b>Total govern'm't-and-contractor gravel</b>	<b>62,828,000</b>	<b>\$24,946,000</b>	<b>49,824,000</b>	<b>\$20,867,000</b>	<b>\$0.42</b>
<b>Total govern'm't-and-contractor sand and gravel</b>	<b>71,399,000</b>	<b>\$29,073,000</b>	<b>57,595,000</b>	<b>\$24,891,000</b>	<b>\$0.43</b>
<b>COMMERC'L AND GOV'T-AND-CONTRACTOR OPERATIONS</b>					
Sand .....	107,371,000	\$74,443,000	82,053,000	\$62,263,000	\$0.76
Gravel .....	196,975,000	114,057,000	152,011,000	90,530,000	.60
<b>Grand Total</b>	<b>304,346,000</b>	<b>\$188,500,000</b>	<b>234,064,000</b>	<b>\$152,793,000</b>	<b>\$0.65</b>

<sup>1</sup> Includes blast sand as follows—1942: 422,922 tons valued at \$1,071,018; 1943: 450,997 tons, \$1,138,003.

<sup>2</sup> Includes ballast sand produced by railroads for their own use as follows—1942: 39,352 tons valued at \$8,740; 1943: 28,032 tons, \$5,399.

<sup>3</sup> Includes some sand used by railroads for fills and similar purposes as follows—1942: 178,191 tons valued at \$27,500; 1943: 170,372 tons, \$23,974.

<sup>4</sup> Includes ballast gravel produced by railroads for their own use as follows—1942: 10,243,680 tons valued at \$2,031,339; 1943: 7,661,118 tons, \$1,957,362.

<sup>5</sup> Includes some gravel used by railroads for fills and similar purposes as follows—1942: 1,294,861 tons valued at \$141,917; 1943: 1,176,243 tons, \$256,318.

<sup>6</sup> Approximate figures for states, counties, municipalities, and other government agencies directly or under lease.



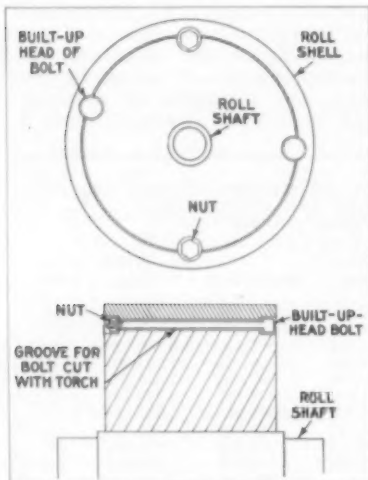
# HINTS *and* HELPS

Practical Ideas Developed by Operating Men

## Stop Roll-Shell Creep

By JOHN F. PRUYN

IN THE ILLUSTRATION is depicted a simple method of stopping a roll shell from creeping. A welding torch is



Simple method of keeping loose roll shells from creeping. Above is shown end view of roll, and below is end section illustrating how built-up head bolt is installed

used to cut a groove for a long 1½-in. bolt. The end of the bolt is then built up by welding. The roll shell is then cut to take the built up bolt head, the bolt being installed as shown in the sketch. This method has been employed on rolls as large as 26- x 54-in.

## Portable "Desanding" Plant

AN UNUSUAL type of equipment has been built by the Ohio Gravel Co., at Newtown, Ohio, to supplement the amount of gravel of crushable size required at its main plant. The

"plant," shown herewith is a portable "de-sander" built on an old shovel frame.

The unit was set up in a section of the company's property where there is an abundance of sizeable gravel as contrasted to the main excavation where 60 percent is sand.

The shovel dumps directly into a hopper over a Kennedy vibrating screen which sizes gravel into two sizes, 1- to 2½-in. and 2½- to 8-in., that are put into the Johnson bin in separate compartments. Minus 1-in. material is stacked as shown for miscellaneous sale.

Trucks haul the two gravel sizes to the main plant where they are stockpiled as raw material for feed into the main plant crusher bins when needed. The market in this area is heavy for crushed gravel and this is an effective way to balance raw materials with the market requirements, without the handling of excessive tonnages of fines and small gravel.

## Reduce Machine Vibration

By W. F. SCHAPHORST

THREE ILLUSTRATIONS show clearly how to take care of machinery that is likely to vibrate and cause noise nuisance. One of the most effective methods is to isolate vibrating machines from the building or from the ground by means of a strong resilient material. Natural cork is generally regarded as best for this purpose. Cork has a natural period of vibration which is invariably different from that of any machine, which fact is of great importance. Cork is also almost perfectly elastic over a long period of years; that is, cork does not gradually yield under pressure as most other materials. Cork is also highly resistant to rotting, warping, swelling, and shrinking.

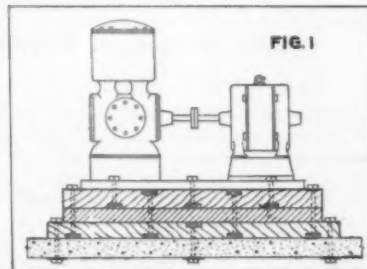


Fig. 1: Method of isolating an electrically-driven unit, which is tied to concrete slab so that vibrations cannot be transmitted to building

Sometimes the cork is placed directly under the machine on top of the foundation as shown in Fig. 1. At other times the foundation itself rests on the cork as shown in Fig. 2, depending on conditions. Thus Fig. 1

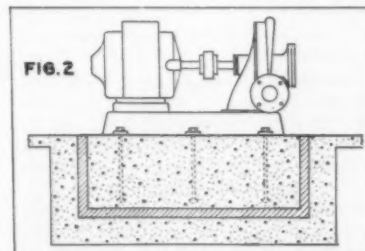


Fig. 2: How to isolate machine without secondary tying bolts such as are shown in Fig. 1

shows how to isolate an electrically driven unit, the unit being completely tied to a concrete slab in such a way that vibrations cannot be transmitted to the building, and yet the machine cannot jump off of the base.

Fig. 2 shows how to isolate a machine without secondary tying bolts

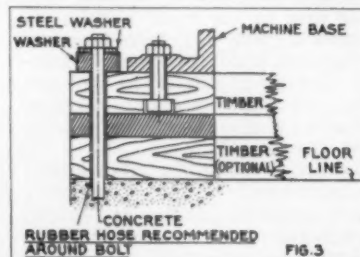


Fig. 3: Another method of isolating machine from floor to prevent transmission of vibrations

such as are shown in Fig. 1. In other words, the concrete base is here placed in a pocket lined with cork. This is usually a very satisfactory method of isolation.

Fig. 3 shows in greater detail how the bolts may be isolated and applied. The "rubber hose kink," for further



"De-sanding" plant built to provide a supplementary source of crushable sized gravel at main plant. Minus 1-in. is stacked and two sizes of gravel are placed in bin for trucking to main plant





Left: Truck with special bodies being loaded for delivery of bulk cement to the job. Right: Tractor-loader dumping cement from box car into truck

isolating long through bolts, is a good one to bear in mind. An objection to rubber is that it soon loses its elasticity, but for this purpose of merely surrounding a bolt that is fixed in position, that fault is of but little importance. Through tying bolts, from the top slab to the lower slab of concrete, are important, to prevent the machine from bouncing around and dragging the top slab and the machine itself around on the floor.

### Unload Cement Rapidly

THE MONOLITH PORTLAND CEMENT Co., of Los Angeles, Calif., has overcome a manpower shortage by unloading cement from box cars with a compact tractor-loader.

The cement is shipped from Monolith on the Mojave Desert, California, to the job. Before the war, the cement was in bags and had to be taken out of the container at the job, involving considerable hand labor at both ends. When labor and packaging materials became increasingly difficult to produce, a new method of shipment had to be developed.

Now bulk cement (except a minor portion shipped by special cement trucks on short hauls) is loaded into box cars, which have two bulkheads, leaving a vacant space about 9 ft. wide at the door of the car. This space permits a small tractor-loader, known as the "Payloader", to enter the car immediately on arrival for the removal of the cement. A portable platform, built upon a trailer, is run up alongside the car on one side. The illustrations show how the cement is unloaded near Torrance, Calif., for use on government jobs.

Illustrations show how the loader picks up a load with shovel in the freight box car and then dumps it into trucks with special bodies for delivery to the job. This method has been in operation for over a year and has been satisfactory from the stand-

point of speed, manpower reduction and economy. Maintenance cost on the machine has been extraordinarily small. One man with the loader unloads 18 to 20 tons of cement per hour from box cars and loads it onto the trucks, there being less tonnage handled during the final cleaning up of the car.

The Payloader, made by the Frank G. Hough Co., Libertyville, Ill., is a complete, hydraulically operated tractor unit. The model illustrated has a bucket capacity of one-third cubic yard.

### Mounting Alignment Charts for Laboratory Use

By C. J. KNICKERBOCKER

IT IS ESSENTIAL to the proper use of graphs and charts in the cement mill and laboratory that they be substantially mounted in an accessible, well lighted location and that the alignment guides be properly constructed.

Wall mountings near the record sheets are usually most convenient. A satisfactory means of mounting is to attach the print to a Masonite or other rigid board with transparent tape, and similarly secure a sheet of cellulose acetate over the print, placing the convex side down. Moulding made from strip Masonite and secured to the board with screws provides a frame. For charts requiring vertical solution lines, the top and

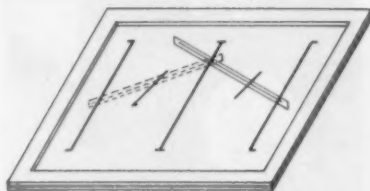
bottom frame sections are secured at the ends and raised enough to permit sliding sheet acetate guide strips beneath them. Some large charts require elevated side frames.

The guide strips are cut sufficiently wide to prevent side deflection, are center lined and of length sufficient to connect the maximum spaced readings and extend beyond the outer frame edges. A still more appropriate means is to cut a slit about 1 mm. wide along the center of the strip and limit the length to allow use within the frame. Values may be aligned through the slit and reference or turning points held with a pin point while the guide is moved to a new setting. The sketch is illustrative of this latter method.

### Controlled Flow of Ore-Pulp

CONSTANT and controlled flow of wet ore-pulp through an orifice has been obtained with a device developed by the Bureau of Mines, according to Dr. R. R. Sayers, Director of the Bureau. This device facilitates the efficient operation of a classifier in the concentration of minerals.

Known as a "periodic pincer," the apparatus was produced in connection with an investigation of iron ore concentration conducted by the Bureau, but it undoubtedly has applications in the industrial minerals field. Tests prove that the device can be used both in commercial and laboratory work. It controls the flow of wet ore-pulp by a periodic opening and closing of a collapsible rubber tubing which terminates an oversize orifice, the oversize opening preventing choke-ups. The device is operated by an electric motor and in practice it introduced precision approaching that of a weightometer, states the Bureau report.

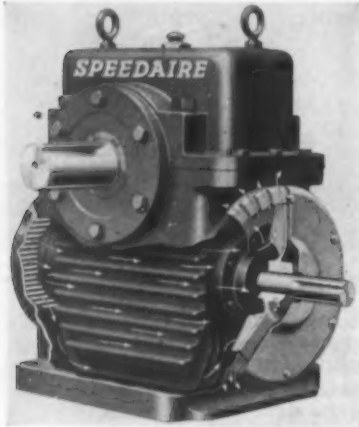


Method of mounting alignment charts for laboratory use

# NEW Machinery

## Worm Gear Reduction

CLEVELAND WORM AND GEAR CO., Cleveland, Ohio, has announced its Speedaire worm gear reduction unit. This unit features a fan cooling sys-



Cut-away section shows double-wall construction of worm gear reduction unit

tem which, it is claimed, permits a pronounced reduction in size of the unit required for a given horse-power output. The basis of the cooling system is a new type of double wall construction which provides an air passage completely enveloping the oil reservoir in which the gear operates. The inner housing wall forming the oil reservoir is deeply finned on the air side, resulting in an increase in heat-dissipating surface.

An exhaust fan located on the coupling end of the worm shaft draws air at high velocity through the space between the housing walls from a grill at the opposite end of the unit. This fan is designed to operate with either direction of rotation. The operating temperature is lowered by means of this high velocity air stream enveloping the oil reservoir, giving this unit a much greater load-carrying capacity.

## Acidity Tester

R. P. CARGILLE, New York, N. Y., is marketing a simple but accurate soil acidity tester for agricultural limestone producers which may also have an application in the cement industry for testing slurries, etc. An advantage claimed for this tester is that the indicator, instead of showing various shades of the same color for different pH (acidities), shows three distinct colors at the three critical points or soil acidity; namely, lemon yellow at pH 5.0, brownish red at pH 6.0, and purple at pH 7.0. Any-one inexperienced in making soil

acidity tests can easily read these colors.

If the test shows a lemon yellow color that is a danger signal that the soil is too acid for all but a few of the "acid-loving" plants. A card accompanies the tester which gives information about its use.

To use the tester, the manufacturer states: Stir up a sample of the soil with water, place a drop or two of the water on a strip of test paper, and observe the other side. If the liquid passes through the paper it filters out the particles of soil and gives a clean color on the other side.

## Laboratory Furnaces

HARPER ELECTRIC FURNACE CORPORATION, Niagara Falls, N. Y., has announced a complete line of high temperature laboratory furnaces with maximum temperatures of 2750 deg. F., and operating temperatures of 2500 deg. F.

One of these furnaces is said to be especially adapted for use in the control laboratories of cement manufacturers. This furnace, known as HL-5, illustrated herewith, has a maximum operating temperature of 2750 deg. F.

It has a chamber size of 2 3/8 x 3 1/2 x 5 in. All the furnaces are suitable for heating materials in an oxidizing atmosphere at temperatures above those obtainable with metallic elements. They also have many applications where special conditions are involved, such as rapid heating, or heating in special atmospheres not injurious to silicon carbide.

These high temperature laboratory furnaces are equipped with a silicon carbide muffle and are heated with non-metallic heating elements lo-

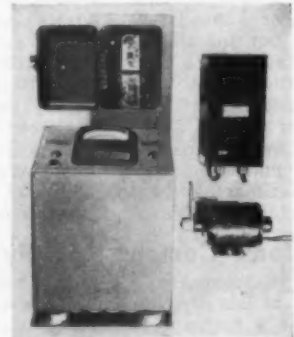


High temperature laboratory furnace

cated above and below the muffle to assure uniform distribution of heat. Either a plug type or a counter-balanced door is available. Furnaces are made in various sizes with chamber dimensions of 2 3/8 x 3 1/2 x 5 in., and up to 5 1/2 x 6 x 18 in. They are available for bench mounting or with legs for floor mounting.

## Crane-Stability Gage

GENERAL ELECTRIC Co., Special Products Division, Schenectady, N. Y., has developed a crane-stability gage for use on boom-type cranes and similar equipment. This gage safeguards equipment of this type by continuously and accurately measuring its stability, against handling loads in excess of the rated capacity at a given radius, and against ex-



Crane-stability gage

tending the boom to an excessive radius for a given load. It is said its use not only eliminates dependence on the operator's judgment but also permits maximum use of the crane.

In principle, the new gage measures the tipping moment or the degree of crane stability by determining the amount of deformation in the structural member of the crane upon which a strain gage is mounted. Any deformation in the member changes a small air gap in the strain gage, and since this gage and its balancing unit form two legs of an alternating-current bridge, the change causes a deflection to register on an instrument on the indicating unit.

The complete gage consists of a strain gage and an accompanying balancing unit, an indicating unit, a constant-voltage transformer, and a boom-angle compensator. The indicating unit contains a partial bridge circuit, various transformers, a sensitivity adjustment, and an electronic relay for operating the alarm circuits, or in the case of cranes with full magnetic control, the control circuits. The constant-voltage transformer, which is used in the gage

## NEW MACHINERY

power circuit to prevent interference by voltage variations, permits accurate gage operation despite variations within the range of 95 to 125 volts on 60 cycles frequency, accurate to plus or minus one cycle. For compensating the gage circuit output for various boom angles, a small, rotary voltage regulator or boom-angle compensator, as it is called, is furnished.

### Liquid Level Indicator

TECHTMANN INDUSTRIES, INC., Milwaukee, Wis., has announced that its patented U-C indicator has been



Liquid level indicator and method of attachment with faucet

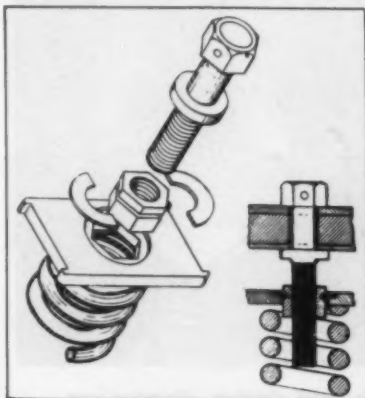
made adaptable to 30-gal. steel drums in addition to the 55-gal. steel drums on which it has been used for several years.

This device tells at a glance the liquid level content of drums containing oil, solvents, etc., and keeps a constant check on the supply of vital liquids.

### Emergency Shear Plates for Roll Crusher

IOWA MANUFACTURING Co., Cedar Rapids, Iowa, has devised emergency shear plates as a safety improvement against roll breakage. Under ideal working conditions, heavy helical springs of chrome vanadium steel maintain proper tension on the floating roll and keep the opening for material constant; yet when uncrushable foreign material is introduced, the springs protect the roll by relieving the undue stress and prevent breakage.

If exceptionally large uncrushable material passes into the rolls, shear plates at the butt of the springs snap and free the springs completely. Each shear plate consists of 11-gauge sheet iron, and is located in the slot of the adjustable plate that holds the spring



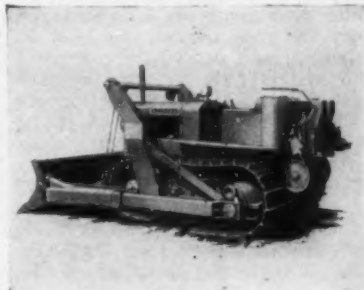
Shear plate protects roll crusher

in position as shown in the illustration.

Any large piece of uncrushable material, such as tramp iron, would cause the nut, slotted for and holding the shear plate, on the end of the adjustable screw bolt, to shear the plate and allow the unrestrained bolt to pass through the spring and instantly release all tension on the floating roll. To resume operation, it is only necessary to replace plates.

### Double-Trunnion Tilt Dozer

THE BUCKEYE TRACTION DITCHER Co., Findlay, Ohio, has brought out a cable-controlled side-lift bulldozer and trailbuilder, featuring single king pin mounting of the moldboard and double trunnion tilting. The moldboard of the trailbuilder can easily be angled to the right or left on the single king pin simply by removing two landside pins, swinging the blade



Cable-controlled, side-lift bulldozer and trailbuilder has new features

to the desired side, and replacing the landside pins which hold it rigidly in place. The double trunnion mounting makes it possible to tilt either end of the blade 12 in. by attaching one push arm to the top trunnion on one side while the other arm is mounted on the lower trunnion on the opposite side.

Horn and push frame, which have been redesigned, are fabricated from heavy steel welded boxbeams to provide maximum strength. Welded V-shaped vertical braces and heavy steel plate horizontal cross pieces reinforce the blade so that it can withstand the toughest bulldozing.

### Induction Motors

ELECTRIC MACHINERY MANUFACTURING Co., Minneapolis, Minn., has announced a new line of large, heavy-duty induction motors, ranging in size from 200 hp. to 1000 hp., and in squirrel cage and wound rotor models.

Motor frame construction is of fabricated steel plate or close-grained cast iron, depending on the size and type of motor. Form-wound stator coils have multi-layer insulation with high dielectric strength and moisture resistance, states the announcement.

The coils are made somewhat pliable to withstand the strains of heavy service.

A rotor fan and conical baffling provides directed, smooth-flow venti-



Drip-proof, wound rotor motor rated at 300-hp., 1800 r.p.m.

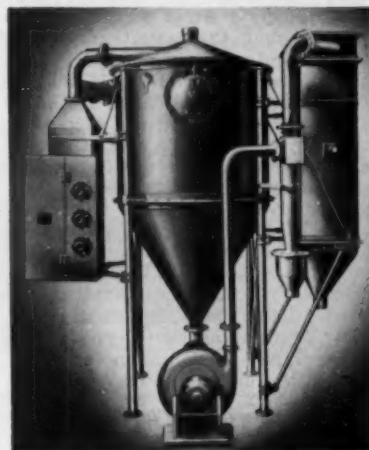
lation for cool motor operation. One-to-one ratio sleeve bearings are standard, but ball or roller bearings can be supplied. Protective enclosure for drip, splash, or other special conditions, and enclosed construction for direct ventilation can be furnished.

### Spray Dryer

WESTERN PRECIPITATION CORPORATION, Los Angeles, Calif., has announced development of the type N Turbulaire spray dryer for the commercial drying of high value products, for use in laboratory research, and in pilot plant operation on specific materials.

Standard equipment includes electric heater, 4-ft. desiccator with cone bottom and hand-operated mechanism for sweeping surface accumulations from the conical section, Multiclone collector, fan, bag house and control instruments mounted on a single frame for maximum compactness and ease of installation.

The type N spray dryer is rated at an evaporation of 25 lb. of water per hour at an inlet-to-outlet temperature differential of 300 deg. F.



Small capacity, spray type dryer



## Practical Conveyor Belt Operation

Part 11: Concluding article of series describes methods of obtaining speed reduction at the conveyor driving pulley

WHEN THE METHOD of conveyor drive is to be considered there are several methods of securing the speed reduction necessary at the driving pulley, all of which have their



This is a case of poor housekeeping. A poorly designed tail pulley scraper was not kept clean and has grooved the pulley and has caused over-stress in belt

proper place. These methods, in general, are:

1. Line shafting flat belts and pulley
2. Open gearing
3. Sprockets and chain
4. Enclosed speed reducers
5. Combination of any of the above

Where it is desired to keep the first cost to a minimum, one of the first three methods probably would be used. If there is line shafting near the drive pulley of the conveyor, it is possible to connect directly to the pulley by means of sprocket and chain. Such a drive would be the cheapest, but this situation is not often found. Drives through open gearing are very common. If motors of 900 r.p.m. or 1200 r.p.m. are used it is possible to obtain the necessary reduction through two sets of gears, and it is common practice to use cut gears from the motor to the countershaft and molded gears from the countershaft to the head pulley. A variation of this drive is sometimes made by using a silent chain from the motor to the countershaft.

Still another variation of this drive uses "V" belts or short center flat belts with self-tensioning motor bases between the motor and countershaft.

\*Chief engineer, New York Trap Rock Corp., Newburgh, N. Y.

†Formerly with Engineering Department, New York Trap Rock Corp.

By MELVIN C. DOW\* and  
HARVEY A. HARNDEN†

When the power required becomes a considerable amount, all of the above types of drives result in large and awkward installations. The enclosed gear reduction units offer the best solution to the problem and where the operator is not limited to installing the cheapest possible drive, these modern units will be a worthwhile investment for any conveyor. They are to be recommended for all important and permanent conveyors. The writers have in mind a stone crushing plant where 48 herringbone reducers, both the parallel shaft and right angle types were installed on conveyor drives over ten years ago. These units range from 5 hp. to 100 hp. each and operate from 8 to 24 hrs. a day during nine months of the year. During the ten years they have operated there has never been a moment's delay caused by a failure in any unit. Outside of inspection and regular lubrication the maintenance cost has been negligible. There is very little equipment in a crushing plant for which a similar statement could be made.

### Selecting Speed Reducer

In selecting the proper speed reduction unit, the operator has a

choice between a slow speed motor and a relatively low ratio reducer or a higher speed motor and a high ratio reducer. The slow speed motors cost more than higher speeds of the same power so that the most economical combination will depend on the transmitting capacity of the reducer. In belt conveyor work 900 r.p.m. motors with double reduction units often make an excellent combination, but sometimes a 1200 r.p.m. motor with a higher ratio can be used which will have ample capacity without going to the next larger size reducer. This possibility should always be investigated.

In the past it was not possible to fairly compare the cost of one manufacturer's reducer with that of another manufacturer because different systems for rating the capacity of the reducers were used. Some manufacturers were more conservative in their rating tables than others. Nowadays, however, the user of reducers can be certain of what the power ratings means if the rating tables are calculated in accordance with the standards of the American Gear Manufacturers Association. It is suggested, when purchasing a reducer, that the user specify that the name plate be stamped with the input speed, the ratio of reduction, the A.G.M.A. service factor, the service rating and the catalog rating. The



Hinged skirt which may be raised when belt is loaded elsewhere, eliminating wear



## CONVEYORS



Courtesy Goodyear Tire & Rubber Co.

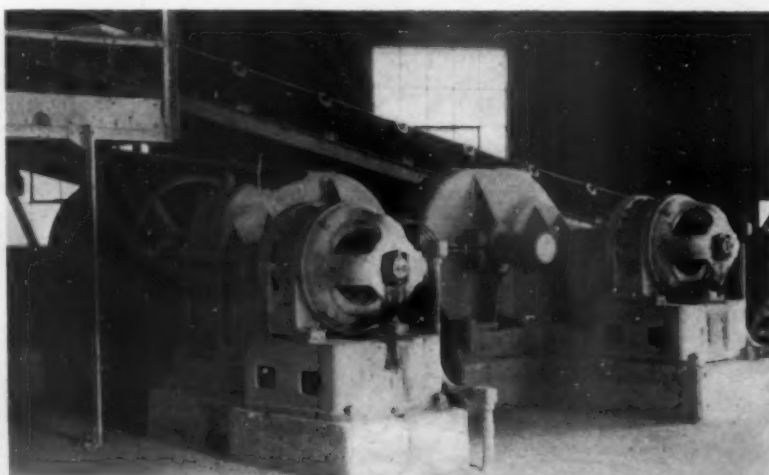
Conveyor belt system at Anderson Ranch Dam over Boise river, Idaho. Note rugged terrain over which conveyor operates and the long stone ladder which is part of conveyor belt system to lower level where aggregates are discharged

writers know of several instances where reducer failure could have been avoided if this data had been stamped on the name plate of the reducer case.

If in the selection of the conveyor it is necessary to drive through tandem pulleys, two possibilities should be investigated. First, there is the customary method of a motor and one reduction unit directly connected to one driver with the tandem pulleys connected by cut spur gears. The second possibility is an individual motor and reducer directly connected to each driving pulley. In the case of the single unit and gears between the pulley it can be shown both theoretically and by actual test that the first driving pulley (that is, the one nearest the head) transmits about three-fourths of the power, and the second pulley about one-fourth of the power. The first cost for such a drive will be lower where the power requirements are 50 hp. or under. Where the power requirements are greater, say 100 hp. or more, the individual pulley drives are more nearly equal to the cost of the gear-connected drive and may possibly be less. Even at a slightly greater first cost the individual drives are to be preferred as they are neater, quieter, and run without the danger and maintenance difficulties incident to open gearing. In the case of individual pulley drives, slip ring motors are used and the power under average conditions will be found to be nearly equally distributed between the two pulleys. The results of power tests made on seven conveyors in which this type of tandem drive was used showed the following distribution between the driving pulleys:

Belt	Horse Power		Total	Percentages	
	Pulley No. 1	Pulley No. 2		Pulley No. 1	Pulley No. 2
48-in. ....	72	60	132	54.5	45.5
48-in. ....	56	52	108	51.8	48.2
36-in. ....	41.6	35.2	76.8	54.2	45.8
36-in. ....	44.8	41.6	86.4	51.9	48.1
48-in. ....	60	64	124	48.4	51.6
42-in. ....	32	24	56	57.1	42.9
48-in. ....	36.9	39.0	75.9	48.5	51.5

When all of these items have been decided upon, namely, the belt, the idlers and the drive, we are in a position to sum up the total first cost of the equipment. From this we are able to estimate the yearly cost. The first item in the yearly cost will be the interest on the original first cost. The next item is the cost of power which we should be able to compute from our conveyor calculations. The next three items in the yearly cost might be considered together since they are so closely related. These are the items of maintenance, repairs, and depreciation. The largest factor in the cost of these is the belt itself and here the record of past belts is the safest



Tandem pulley drive with individual motors and reducers directly connected to each pulley. Each pulley takes about 50 percent of the load

guide to the probable cost. Repairs to the conveyor machinery itself is not an important factor in the yearly cost, if proper maintenance in lubrication and housekeeping is the rule. If the drive reduction is through a modern enclosed gear reducer, the yearly maintenance cost will be very small, but if the drive is of the other types mentioned, cheaper in first cost, the yearly depreciation will be considerable, perhaps 20 to 30 percent.

All of these items will make up the total yearly cost, but in selecting a conveyor, the operator should temper his decision with the knowledge that the better equipment will insure reliable service at all times, perhaps

yond the control of the designer. However, if the design is made carefully and with a thorough knowledge of the job to be done and the operation is carried out with proper maintenance repairs and vigilance of routine inspection, the only remaining factors affecting the costs will be those inherent in the job for which the belt was intended—that of receiving, transporting, and discharging the material.

The importance of accurate cost records is apparent; they are the operator's indicator of the job being done, the possibilities of improvement, and above all they indicate the proportion of his total costs involved in this neglected item.

By giving this subject the careful attention that is its due the operator will not only benefit himself but will be making an important contribution to the conservation of essential war materials so vitally needed.

## Propose Vermiculite Mill

VERMICULITE deposits in the Bear Paw mountains south of Box Elder, Mont., may be developed by a California concern, according to local reports. Negotiations are now under way with the W.P.B. for priorities to construct a \$100,000 vermiculite processing mill either at Box Elder or at Bear Paw Mining & Milling Co.

## Add Crusher

THE GROVE STONE AND SAND CO., Swannanoa, N. C., has recently added a Telsmith cone crusher to its equipment. This crusher has a capacity of 125 tons an hour. The company also operates a Dunbrik plant for the manufacture of concrete brick with a capacity of 15,000 units daily.

when a shut-down loss would pay the additional cost.

## Conclusion

It has been the experience of the writers that most conveyor belts do not wear out doing the work intended but die an untimely death through neglect, abuse, or an accident. It has been emphasized that this is not always appreciated by the operators as, even in these cases, belts last a remarkably long time, and consequently the actual costs are lost over the period of years.

Some of the factors affecting belt costs are beyond the control of the operator. Some of these also are be-

# Basic Dolomite Advertises Agstone

Series of newspaper advertisements designed to promote the use of bulk agricultural limestone

**E**ARLY this year, Basic Dolomite, Incorporated, Cleveland, Ohio ran a series of advertisements in newspapers in western Pennsylvania and western New York to educate farmers as to the advantages of using bulk agricultural limestone. Two of these advertisements are reproduced herewith.

Following up the newspaper campaign, the entire series of advertisements was reproduced as a mailing folder, 9- x 13-in., and sent out to dealers, etc. The entire campaign was designed to educate farmers to use bulk agricultural limestone, and to explain how this economical fertilizer could be conveniently applied to the land. Various methods of applying the agstone were described and the latest equipment for this purpose explained.

One of the advertisements played up the advantages of Basic Super 10,

the trade name given the product of Basic Dolomite, Incorporated, including chemical analysis and screen analysis. Another advertisement showed an illustration of the quarry and plant in which the agricultural limestone is prepared. Other advertisements described modern methods of applying the agstone and convenient loading facilities from railroad cars to trucks.

The newspapers carrying the advertisements included the *Observer Reporter*, Washington, Penn.; *Herald American*, Donora, Penn.; *Review-Tribune*, Greensburg, Penn.; *Democrat Messenger*, Waynesburg, Penn.; *Herald Standard*, Uniontown, Penn.; *Times Mirror*, Warren, Penn.; *Times Herald*, Olean, N. Y.; *Republican Press*, Salamanca, N. Y.; *Reporter*, Wellsville, N. Y.; *Grape Belt Weekly*, Dunkirk, N. Y.; *Chautauqua News*, Sherman, N. Y.; and *Republican*,

Westfield, N. Y. The advertisements were prepared by the Griswold-Eshleman Co., advertising agency, Cleveland, Ohio.

## Magnesite Royalty Case

A NEW TRIAL was denied the State of Washington in its case against the Northwest Magnesite Co., involving claims of the state for additional royalties from the operation by the company of a state-owned property. Judge M. E. Jessep in his decision in March denied most of the claims of the state for additional royalties, but also ruled that some of the deductions made by the magnesite company were improper and called for an accounting before entering final judgment.

## Safe Blasting Practices

NEW YORK TRAP ROCK CORPORATION's safe blasting practices are described in an interesting manner by Norman King and Allen D. Look of the Bureau of Mines in Bulletin R. I. 3752. This 10-page bulletin may be obtained by addressing the Bureau of Mines, Department of Interior, Washington, D. C.

## BULK LIME

SAVES TIME AND LABOR

**F**ARM labor is scarce. Nobody knows about that better than you do, Mr. Farmer. And every minute of your own time this spring, when the weather is fit, is going to be taken up with plowing and sowing and planting.

Then why waste valuable hours felling around with sack lime, that has to be unloaded in the barn, handled a sack at a time and later laboriously put on the field with a drill?

The modern time and labor saver is BULK lime. It's hauled to your field by the Basic Super 10 servicing agent. It's dumped at any convenient spot, because weather doesn't hurt it. It's spread rapidly with a spinner-type spreader, on any field you can drive a team or truck over.

These fast-operating spreaders are available for your use through the Basic Super 10 servicing agent who delivers your lime. In some cases he may be able to do the spreading for you.

Best of all, you get MORE lime—from a fourth to a half more, when you use BULK lime. Ask your Farm Checker or County Committee how much more you'll get on the Conservation Program if you order BULK lime instead of sack lime this year. You'll be surprised. And you'll order BASIC SUPER TEN.

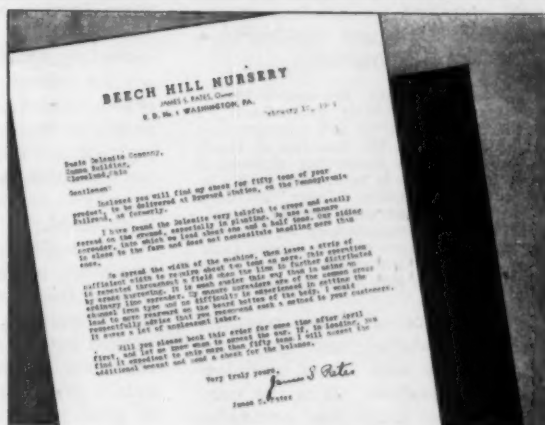
Remember this—FARMERS WHO TRY BULK LIME DON'T GO BACK TO SACK LIME.



**BASIC DOLOMITE, Incorporated**

733 HANNA BUILDING

CLEVELAND 15, OHIO



## What a farmer thinks of BULK LIME

**F**OR the third straight year James S. Pates is ordering a carload of BASIC SUPER 10 BULK LIME for his farm in Washington County, Pa. Above is his letter. Read it.

Mr. Pates knows from personal experience that what we have been saying about this BULK LIME is true—that it's pure lime, easy to handle, easy to spread, and best of all, that Basic Super 10 gives him more lime for his money because it comes in bulk instead of in sacks.

Mr. Pates is one of the hundreds of farmers who are now using BULK LIME and who won't ever go back to expensive sack lime. Now is the time for YOU, too, to try bulk

lime. Ask your County Committee or Farm Checker about it. Find out how much more lime you'll get this spring if you order BASIC SUPER 10. You'll be agreeably surprised—and you'll order BULK LIME, too.

Remember this—FARMERS WHO TRY BULK LIME DON'T GO BACK TO SACK LIME.



**BASIC DOLOMITE, INCORPORATED**

733 HANNA BUILDING • CLEVELAND 15, OHIO

Two samples of the attractive newspaper advertisements which have been used to promote the sale of agricultural limestone



## Evaluation of Aggregate Gradations

### Part 1: Graphical method of specifying aggregates for pavements

By GEORGE W. ECKERT\*

**M**ETHODS OF SPECIFYING aggregate gradations by the usual cumulative and differential curves have been discussed by Stanton Walker<sup>1</sup> and a definite trend to the use of the cumulative curve was indicated. The standard method of plotting cumulative curves involves the use of semi-logarithmic graph paper, plotting percentages on the arithmetic scale and sieve sizes on the logarithmic scale. These curves have various shapes depending on the type and size range of the aggregate, but it is very seldom that a straight line relation is obtained. The advantages of having a graphical method which would represent the grading of aggregates by a straight line has been outlined by J. B. Austin<sup>2</sup>:

If this can be done, the course of the curve can be completely determined, in principle at least, from two experimental observations, and in practice a small number of points commonly suffices if the range covered is relatively wide. In addition, interpolation is easy, the data can be extrapolated with reasonable certainty, and the consistency of a given set of measurements can be judged from the deviation of individual points from the best straight line through the set.

The gradation of certain powders, pulverized material, and very fine aggregate has been found to follow probability relations. It is the purpose here to apply the principles which have been developed for finely pulverized materials to information on paving aggregates.

P. S. Roller<sup>3</sup> in 1937 used the probability relation:

$$y = a - \left(\frac{b}{x}\right)$$

where:  $y$  = weight per cent of all material less than the diameter  $x$

$a, b$  = constants

to study the size distribution of particulate materials. He found that by plotting  $\log(y/x^a)$  against  $1/x$ , a straight line was obtained for a number of materials. Drinker<sup>4</sup> in 1925, however, used the much simpler method of using logarithmic-prob-

ability graph paper to plot size distribution of dusts. This method has since been used for various pulverized materials by other investigators.<sup>5</sup>

Stanton Walker,<sup>1</sup> in his discussion of evaluating aggregates has presented typical specifications for asphalt and concrete sand. His data give the curves by the logarithmic-probability graphical method shown in Fig. 1. The tendency for the gradations to give a straight line relation is readily apparent. Curves A and C for asphalt sand deviate more from a straight line than B. An inspection of Walker's curves (semi-logarithmic) shows that they are not smooth; if smooth curves are drawn as best as possible through the points on Walker's cumulative graphs and corresponding values plotted by the logarithmic-probability method, a very close approach to straight lines is obtained.

Data published by Roy Cross in the *Handbook of Petroleum Asphalt and Natural Gas*<sup>6</sup> may be used to compare the gradations which have been worked out for sheet asphalt and bituminous concrete pavements. The data is given for typical compositions of good mixes of the types represented, and is plotted in Fig. 2:

Sieve Sizes (Inches).....	.0229	.0068	.0150	.065	.185	.380
Sheet asphalt—top course.....	14.4	40.0	70.5	100.0	...	...
Bituminous concrete—Topeka mix.....	13.0	26.1	47.9	89.3	...	...
Bituminous concrete—Warren mix.....	5.8	8.8	15.9	41.8	58.1	72.1

D. M. Wilson<sup>6</sup> has presented data for typical gradings of compressed asphalt, mastic asphalt, and steam rolled asphalt type pavements as used in England, as shown below.

The curves obtained by plotting these data on logarithmic-probability graph paper are given in Fig. 3. These

curves are not straight lines, but the trend of the curves can be very well represented by such and any information desired from a graphical presentation could be obtained with these straight lines.

The curves in Figs. 1-3 indicate that the processes through which development has proceeded have resulted in aggregate gradations which tend to follow a probability relation, which for the types considered can be represented by a straight line on graph paper with the size of the sieve openings being plotted on the logarithmic scale and the percent by weight of aggregate passing the given sieve sizes on the probability scale.

In Fig. 4, a satisfactory grading and an unsatisfactory grading of asphaltic concrete aggregate are illustrated, the plotted information for which was taken from data published by Agg.<sup>7</sup> Aggregate A in Fig. 4 has been stated by Agg to be deficient in material passing the 200-mesh and also the 80-mesh sieves. The gradation of aggregate B in Fig. 4 approaches a straight line relation. These curves indicate that:

- an unsatisfactory grading may be indicated by deviations from a straight line relation
- a satisfactory grading may be indicated by a straight line.

The fact that a straight line is outlined for a particular aggregate may not indicate a satisfactory grading, however. The slope and position of the line must also be considered, that is, the fineness or coarseness of the material. A steep slope indicates a

(Continued on page 151)

Sieve Size (I.M.M. sieves)	No. 200	No. 100	No. 70	No. 50	No. 30	No. 20	No. 10	1/2
Compressed asphalt paving	14.5	40.0	48.0	57.6	72.4	86.0	100.0	...
Mastic asphalt paving.....	14.0	33.6	42.0	50.0	66.8	83.6	100.0	...
Steam rolled asphalt:								
Sand mixture .....	1.2	31.4	75.2	96.4	99.8	100.0	...	...
Clinker .....	4.9	20.5	26.1	34.8	47.4	62.0	89.2	98.6

\*Formerly Research Chemist, Missouri State Highway Department. Now with Texas Co., Beacon, N. Y.



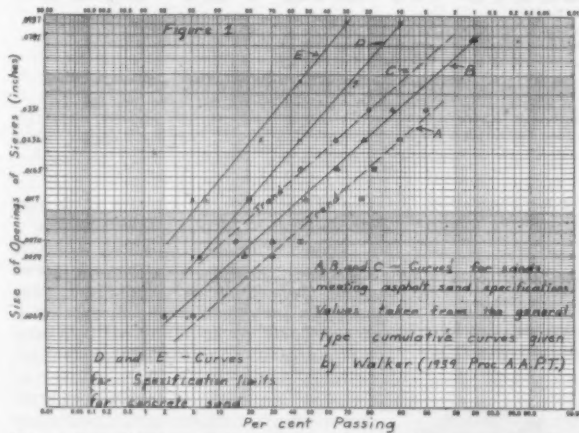


Fig. 1: Logarithmic-probability method of evaluating aggregates for asphalt and concrete sand mix

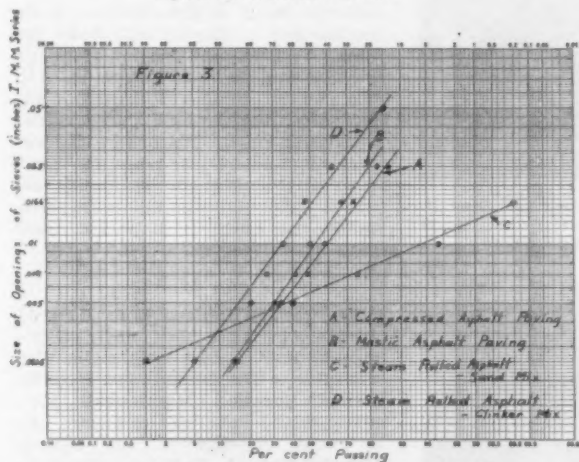


Fig. 3: Curves plotted for four types of pavement mix

Fig. 6: Probability curves showing how grading lines deviate from a straight line for the larger sizes

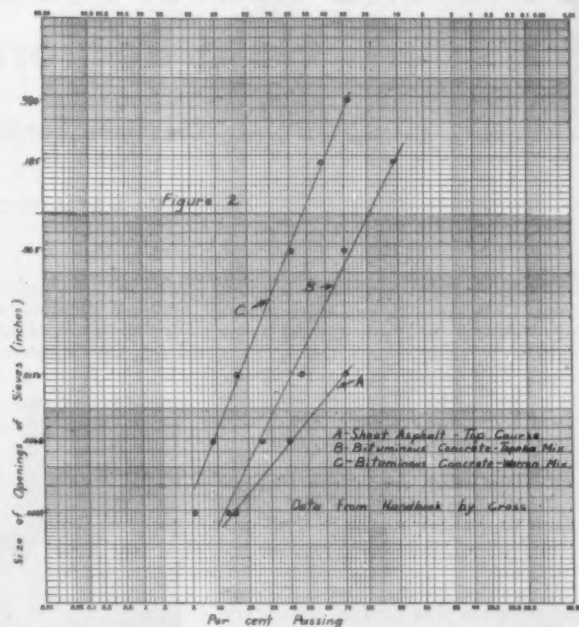
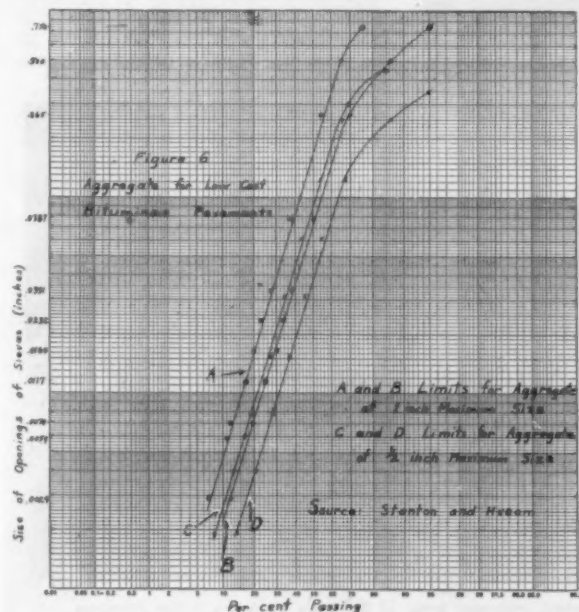


Fig. 2: Typical compositions of mixes for sheet asphalt and bituminous concrete pavements

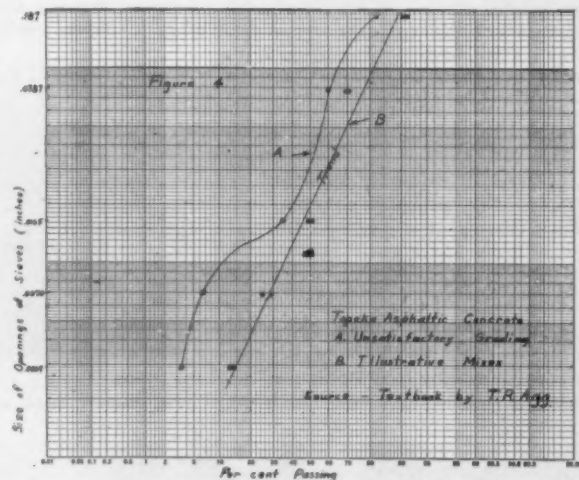
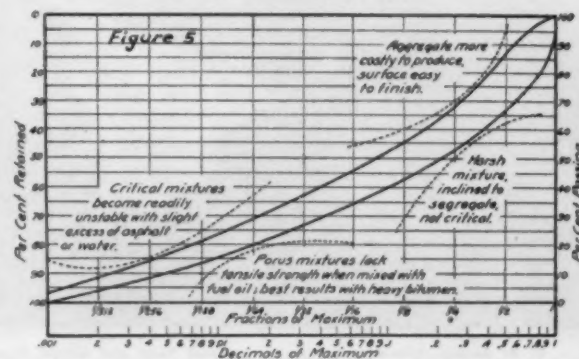


Fig. 4: A satisfactory grading and an unsatisfactory grading of asphaltic concrete aggregate

Fig. 5: Grading curves for aggregates satisfactory for construction low-cost bituminous pavements



# Sand and Gravel Producers in the Far West Hold Regional Meetings

Sessions honor V. P. Ahearn

**T**O PROVIDE PRODUCERS in the Far West with the same opportunities for intimate round-table discussions that producers in the East and Central West have enjoyed and profited from, V. P. Ahearn, executive secretary National Sand and Gravel Association, recently completed a two-weeks' trip which included Denver, Salt Lake, San Francisco and Los Angeles. He was everywhere accorded signal honors and respect, not only as the executive head of the sand, gravel and ready-mixed concrete industries, but as a member of the National War Labor Board, of which he is one of all industry's representatives.

At each of the meetings the theme and program was similar. Secretary Ahearn discussed informally but clearly and comprehensively, the various rules and regulations under which the industry is attempting to operate in these war days. Then followed a round-table discussion with many questions asked and answered as to the application of various specific rules and federal government orders.

## Labor Problems Prominent

Most of the problems which needed to be cleared up concerned the application of wage scales and the 3 percent tax on transportation for hire and the social security tax in relation to hired truckers or contract haulers. Another matter that did not appear to be generally comprehended, is that, according to a Bureau of Internal Revenue ruling, where highway

By **NATHAN C. ROCKWOOD**

material is consigned to the State, in care of the contractor, the transportation tax is eliminated, as the Federal Government has no constitu-



Left to right: Robert Russell and Elmer H. Peterson, Superior Sand and Gravel Co., at Denver Country Club dinner



A. J. Wilson, Granite Rock Co., left, and Anson J. Blake, Blake Brothers Co.

tional authority to make a state pay taxes.

The status of returning soldiers and the law requiring they be given back their jobs or equivalent jobs came in for considerable discussion—particularly as to what attitude the labor unions would take toward non-member soldiers. This is a matter of national importance to all industry, since many soldiers left open-shop jobs, and must return to ones now under closed-shop contracts. The general belief is that neither labor unions nor employers will have the nerve to press the matter of union membership and other union rules in the face of almost certain public resentment. On the other hand, qualified observers do not believe the returning soldiers are coming home with any permanent antipathy towards labor unions, but will eventually use them if it serves their ends, as heretofore.

## Denver Meeting

The stop in Denver, Colo., July 13 and 14, was made particularly enjoyable by F. P. ("Bud") Spratlen, who with Don S. MacDougall, has recently formed Spratlen-MacDougall, Inc., ready-mixed concrete producers. At a dinner meeting at the Denver Country Club, J. A. Bullen, Fountain Sand and Gravel Co., Pueblo, and Robt. Russell and Elmer H. Peterson, Superior Sand and Gravel Co., and Don MacDougall joined in a round-table. Lloyd S. Brannon, Brannon Sand and Gravel Co., was unable to be present. These gentlemen consti-



V. P. Ahearn, executive secretary, National Sand and Gravel Association, addresses group of California producers in San Francisco

tute the major part of the present industry in Denver territory, for most of the smaller producers are inactive at present.

One of subjects of most interest discussed here, as at subsequent meetings, was the attempt being made in many localities, as in the Denver territory, by the Operating Engineers Union to get the ready-mixed concrete industry classified as construction. If successful, this would mean a considerable difference in wage scales for both operating engineers and common labor. On government construction projects, the Department of Labor sets the wages, supposed to be the prevailing local wage scales but in every instance the highest wages paid, and if the producer has a batching or mixer plant on the actual site of the job—that is on government property—he is obliged to pay the scale set by the government for employees actually employed on this construction site, but where he serves the job from an established plant not on the site he is not subject to these wage scales, and in no case should pay them.

The difference between employees of a commercial producer and those of a construction contractor have been thrashed out by Secretary Ahearn and the authorities in Washington. Construction labor is intermittent and moves from job to job, while commercial plant labor is permanent. This difference is recognized by a wage differential, and producers are urged to communicate with Secretary Ahearn before making any change in their wage scales on this account.

### Salt Lake City

ERIC RYBERG, executive vice-president of the Idaho-Utah Sugar Co., and also president of the Utah Sand and Gravel Products Corp., was host to the visitors in Salt Lake City. At a luncheon on July 15 they had an opportunity of meeting the Republican candidates for Governor and United States Senator of Utah.

In the evening there was an informal discussion of the industry problems attended by Ezra C. Knowlton, vice-president of the Utah Sand and Gravel Products Corp.; Clarence Waterfall, president of the Clarence Waterfall Co., Ogden, who is also president of the Inter-mountain Branch of the Associated General Contractors; Mark Tuttle, secretary-manager of the Inter-mountain Branch of the A. G. C.; Gordon T. Hyde, chairman of the state finance commission and also a sand and gravel producer.

### San Francisco

On July 18 practically the entire membership of the Rock, Sand and Gravel Producers Association of Northern California turned out to do honor to Secretary Ahearn and to ask many questions. Dr. Paul Cadman (brother of the late Charles Cadman) economist for the Henry J. Kaiser

Co., spoke briefly on the necessity of individual initiative and use of risk capital in new enterprises in order to meet the postwar problems. Rex Nicholson, director and manager, Builders of the West, reviewed the post-war prospects of the 11 Western States. He said these states were still unprepared to start construction on a scale that will be necessary to prevent extensive unemployment. The City of San Diego, he said was the best prepared in the State of California. The Bay area, he said, was still largely being talked about, rather than prepared. Robt. Mitchell, president of the National Sand and Gravel Association, and John Gregg, both of Los Angeles, met Secretary Ahearn in San Francisco and traveled with the party to Los Angeles.

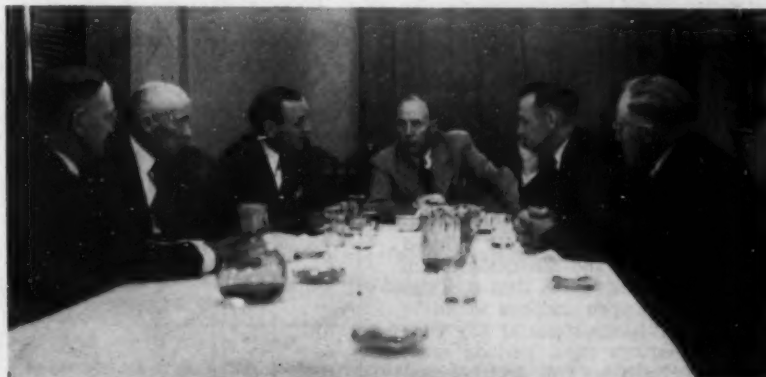
ANSON S. BLAKE, president of Blake Brothers Co. and president of the Northern California Association, Richmond, Calif., presided at the meeting, which was arranged for by W. W. Dennis, executive secretary of the association. In their order around the table, in addition to those already mentioned, were the following: A. B. Ordway, general manager, Henry J. Kaiser Co., Richmond; John E. Porter, Granite Rock Co., Watsonville; A. J. Wilson, Granite Rock Co.; W. H. Taylor, Granite Rock Co.; Dr. Paul Cadman, Henry J. Kaiser Co., Oakland; Carl R. Olson, Henry J. Kaiser Co.; W. H. Harding, Henry J.



"Bud" Spratlen, Spratlen-McDougall, Inc., Denver, Colo., and Joe Bullen, Fountain Sand and Gravel Co., Pueblo, Colo., at Denver conference

Kaiser Co.; A. K. Humphries, president, Pacific Coast Aggregates, Inc., San Francisco; E. J. Goodpastor, vice-president; Donald Mock, J. B. Long, W. L. Neil, G. F. Hampton, Ray Coyle, Jack Cassidy, J. Cayting, R. L. Robinson, Hugh Esey, Frank McMillen, J. Haufman, H. E. Keifer, Walt Storey, all of Pacific Coast Aggregates, Inc.; Nathan C. Rockwood, Rock Products; Otto Kuehne, Jr., Topeka Sand Co., Topeka, Kan.; John D. Gregg, John Gregg, Inc., Los Angeles; O. A. Best, Consolidated Rock Products, Inc.; H. I. Rhine, Bede Gravel Co., San Francisco; R. R. Wood, Bede Gravel Co.; E. H. Peterson and W. A. Grant, Readymix Concrete, San Fran-

(Continued on page 162)



Eric Ryberg presides at luncheon in Salt Lake City where visitors meet Republican candidates for Governor and United States Senator for Utah



John Porter of the Granite Rock Co., one of California's most famous raconteurs, facing camera



## CALCINATION CONTROL for High Calcium and Magnesium Limes

By VICTOR AZBE

### Second and concluding article on this subject deals with the problem of bleeding kilns to increase capacity, and the location of lime kiln finishing zone

**H**eat low in elevation, that is below 1350 deg. F., in high calcium kilns and below 950 deg. F., in dolomitic kilns, is spent and can only be utilized for preheating of stone. But it is known that kilns have more heat of low elevation available than is necessary for stone preheating; that is, more gas of this temperature passes up the stone preheating and stone storage sections of the kiln than is needed for stone coming down the kiln. As natural draft kilns are deficient in capacity, due to low available draft, particularly dolomite kilns, with their low average temperature, it is, of course, objectionable for them to handle the excess gas, as it only tends to reduce their already low capacity still more.

A part of this controlled calcination system includes the withdrawal from the kiln hot zone end of a quantity of gases in excess of that needed for recirculation for the purpose of utilization in gas producers as substitution for steam, for production of chalk, dry ice, air preheat, drying or any other CO<sub>2</sub> utilizing process.

The kiln therefore would be relieved, which immediately would show up as increased draft in the hot zone, thereby bringing in greater quantities of air and allowing admission of a larger amount of combustible, resulting in greater lime producing capacity.

The kiln would be a mild induced draft kiln with the distinction from all induced draft kilns that the kiln top would be open and one would be allowed to charge stone at any time rather than in rigid periods ordinarily necessary. The recirculating gas fan would serve also as the induced draft fan.

Increased capacity brought on in this way would increase efficiency through reduction of radiation loss, etc. Utilization of kiln gases in the producer would also tend to raise efficiency since any external agent, such as steam from a boiler, tends to reduce it, and any increase in efficiency brought on in any manner whatsoever leads to better lime, because it allows for recirculation of a greater quantity of gases and maintenance of a lower temperature in the hot zone.

Reduction of temperature in any combustion apparatus brings about a loss of efficiency which, however, is not the case here for several reasons. Although temperature difference is

lowered, gas volume, its velocity and consequently its heat transfer rate, is greatly increased. The increased mass velocity and turbulence leads to heat equalization through the hot zone, so one section of the shaft is at about the same temperature as any other on the same level, bringing about uniform burning of lime and great reduction of core and residual CO<sub>2</sub>.

In the high calcium kiln the end of dissociation zone is not at 950 deg. F., but the much higher 1350 deg. F. At this temperature the gas offtake pipe shown would not last very long except if it was made from a now too precious metal, nor could the hot gas be handled by any present day fan built of high heat re-

sisting metal. But a solution was developed to overcome this difficulty through injection of air at the far point of the kiln directly into the offtake pipe in quantities sufficient to reduce the temperature of the gas mixture to the desired 950 deg. or 1000 deg. F., at which the offtake pipe will not deteriorate and the fan will function satisfactorily.

It would seem that the air injected might reduce the theoretical efficiency somewhat, but that is not the case since the air mixed with kiln gases would be used in the producer where this air is necessary and so, on the contrary, the efficiency would be increased since producer blast would be highly preheated. There would still be sufficient air necessary above this amount to cool the lime in the cooler.

#### Finishing Zone

The heat absorbing calcining reaction has a tendency in itself to keep surface lime from getting too hot, and as long as the lump is mostly stone, even though the surrounding gases are very hot, the lime surface, through the internal cooling will remain relatively cool. This, however, changes when the core becomes small and is surrounded by a thick layer of insulating lime.

It has been shown that in the lime, the line of calcination progresses at a constant linear rate for any given and constant external temperature. This means that during the first half period 87.5 percent of the stone is calcined and only 12.5 percent during the last half period. (See Fig. 3-C.) The high rate of calcination of the first half period keeps the surface cool and below the temperature of the gases by a decided amount. During this part little harm is done to the lime except possibly during the latter portions of the first half period.

This is quite different during the second half period and the surface of zone of calcination now is very small and so is the amount of heat absorbed. On the other hand, the external and heat-gathering surface is still as large as ever, and since heat is taken away by the internal layers at continuously lower rates, the surface layers are at the same rate acquiring a continually higher temperature. This rise in temperature reduces the time of calcination of internal portions but, at the same

(Continued on page 72)

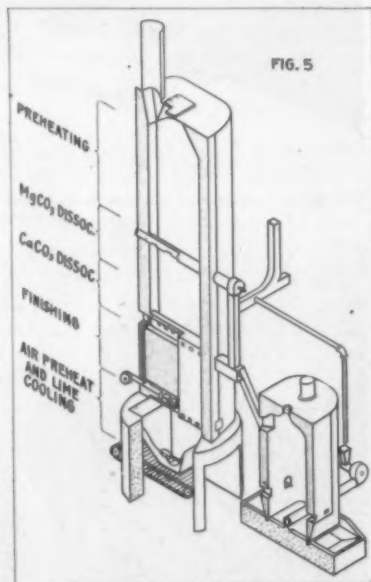
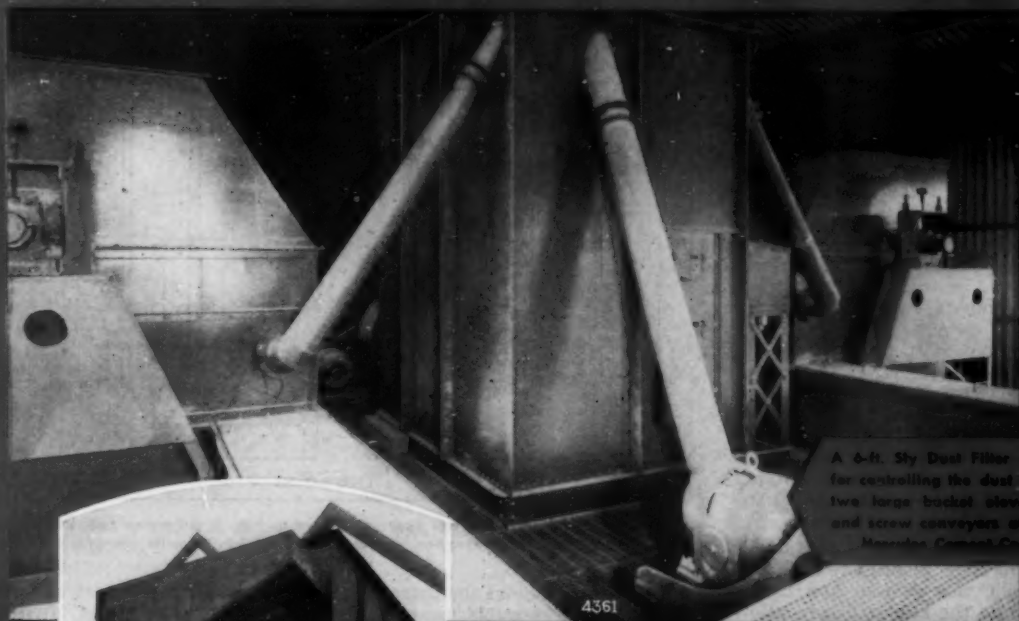


Fig. 5: Showing location of finishing zone in center-burner kiln



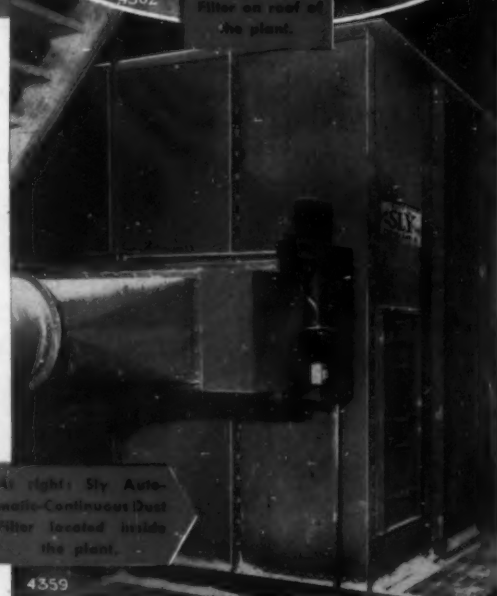
A 6-ft. Sly Dust Filter used for controlling the dust from two large bucket elevators and screw conveyors at the Hercules Cement Co.

4361



Above: Sly Automatic-Continuous Dust Filter on roof of the plant.

4362



At right: Sly Automatic-Continuous Dust Filter located inside the plant.

4359

## Important Savings with **SLY** DUST Control

• This large modern plant of the Hercules Cement Co. uses both automatic and automatic-continuous Sly Dust Filters.

Only Cloth-Screen Type Filters will collect the really *fine* dust. Compared with other cloth-screen filters, Sly provides greater filtering capacity, power savings, easier bag replacement, automatic control, and effect important economies in operation and maintenance.

May we discuss your dust problem with you?

**THE W. W. SLY MANUFACTURING CO.**

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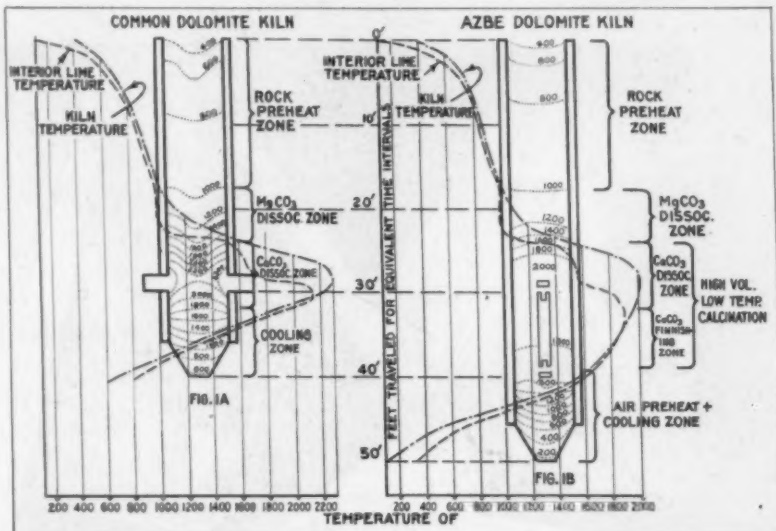
time, it tends to overburn, that is, to physically and chemically impair the surface lime.

Fig. 3-C shows this and one should particularly note the rapid climb of surface temperature and the temperature difference between surface and center of the lime, a difference which was very high considering that the specimen was only a two-inch block.

This seems at first as impossible to avoid, because the temperature difference is necessary to drive the heat within the lime to the stone and if surface temperature is reduced too great, kiln capacity also is reduced. In this situation, the previously described system of hot zone gas recirculation helps, as it, in a manner, substituted a high heat transfer rate; due to high velocity, for that due to high temperature difference. Even then the lime passes through the zone of highest heat when capable of absorbing least of it.

To overcome this, and so further benefit the lime, a specially fired finishing zone was devised and incorporated into the kiln structure below the regular calcining zone. The temperature within this zone is considerably less than in the hot zone above, but yet never less than the dissociation temperature of calcium carbonate in 100 percent  $\text{CO}_2$  atmosphere; namely, 1648 deg. F.

So-called finishing zones—or soaking pits, were utilized before but none were very practicable as they tended



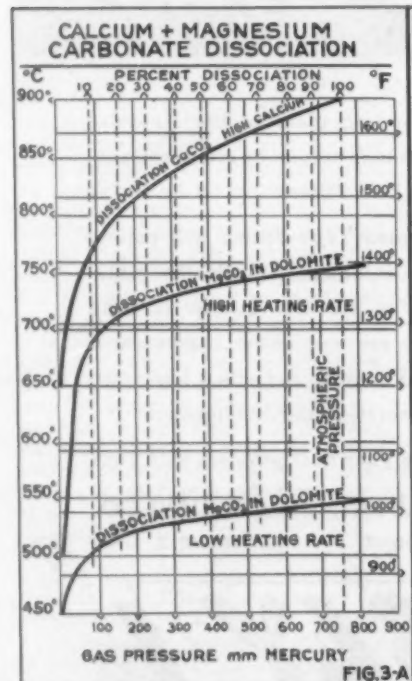
Thermal comparison between two types of kilns. Fig. 1-A: is a common type dolomite kiln which shows only a mild form of irregularity of isotherms. Fig. 1-B: Dolomite kiln with calcination control

to operate mainly on the principle of retaining the sensible heat of the lime coming from the hot zone and were expected to distribute this heat and calcine out the remaining core. As sensible heat content was small the benefit also was small, with the disadvantage that  $\text{CO}_2$  escaping from the inner hotter portions was reabsorbed by the outer layers after same became cooled below dissociation temperature. Since reabsorption, that

is, recarbonation just under the calcination temperature, is virtually instantaneous, even when there was a reduction of apparent core, the good lime became partially recarbonated.

Finishing zones to be effective must be heated, but not by direct application of a combustible, as then general low temperatures are impossible. In the flame and surrounding it, temperature always is too hot so heat

(Continued on page 156)



APPARATUS FOR SIMULTANEOUS TEMPERATURE AND WEIGHT LOSS DETERMINATIONS

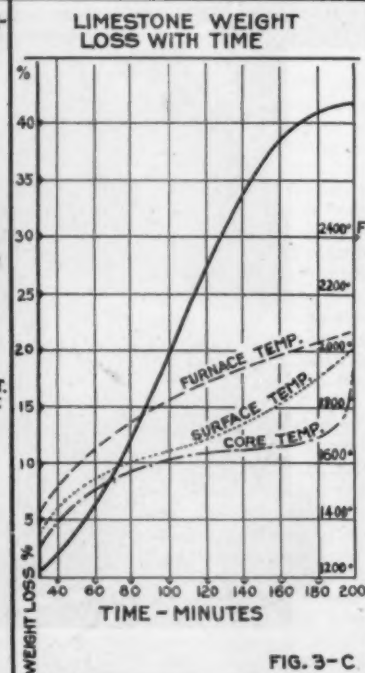
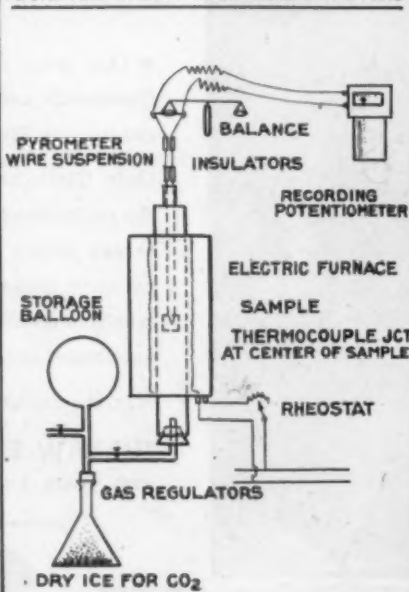


Fig. 3-A: Showing two dissociation temperatures of magnesium carbonate of dolomite. Fig. 3-B: Laboratory experiment to establish lower dissociation temperature for the lower heating rate. Fig. 3-C: Graph showing limestone weight loss with time of heating



# Post-War

## CEMENT INDUSTRY

Judged by what has gone before

By NATHAN C. ROCKWOOD

**A** MERICAN PORTLAND CEMENT is perhaps the only basic products industry which the termination of the war will affect favorably almost immediately. It has had no war-time expansion; with a few exceptions it has not been diverted to manufacture of other products; it is, in general, in sound financial position; its manufacturing plants, while not adequately maintained, have been kept in operating condition, and in 1942 manufactured the largest production on record—180 million barrels—and utilized only something like 70 percent of potential capacity. On the other hand, the industry has been seriously handicapped by loss of personnel, particularly the younger managerial group; by higher fuel costs and consequently higher power costs, and by inability to rebuild or rehabilitate plants in the normal customary manner.

The over-all post-war future of the industry is somewhat complicated by prospective radical changes in sales and distribution methods of long standing. The Federal Trade Commission has already ordered the industry to cease and desist using the basing point price system, and to

quote an established mill base price in every instance. The industry of course will not accept this revolutionary change in its economic set-up without an eventual appeal to the United States Supreme Court; but opinion in the industry is not too hopeful, and it is looking ahead to the eventuality that this industry may be made a guinea-pig for an experiment in "planned economy." Such an eventuality causes thought to be given to greater dispersion of the industry's plants, possibly the use of present large production units for the manufacture of clinker only, with shipment of clinker to grinding mills nearer established markets, in order to have a "mill" base price competitive with more favorably located plants. Of course, all this at present is speculative and contingent on a legal definition of a "cement mill" for price-basing purposes. If packing plants and bulk storage bins should fulfill this definition, probably the number of these detached packing units will be increased, especially

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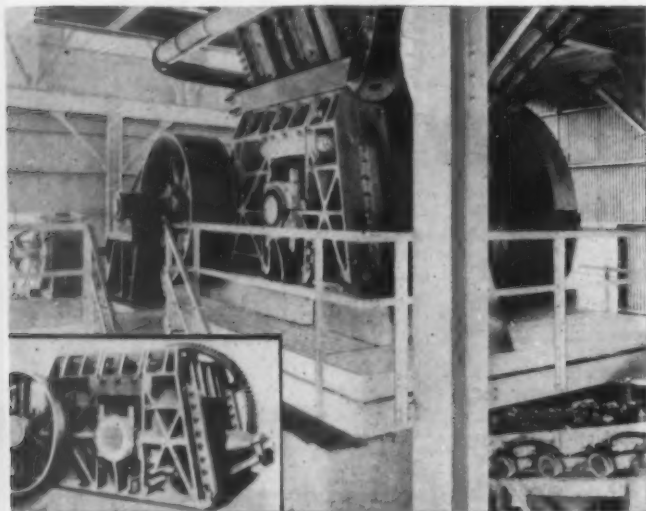


Most recently completed cement plant in the United States of Universal Atlas Cement Co., at Northampton, Penna., incorporates efficient layout of equipment, storage, and packing facilities

# "PENNSYLVANIA"

## PENN-LEHIGH SERIES, SINGLE ROLL PRIMARY CRUSHERS

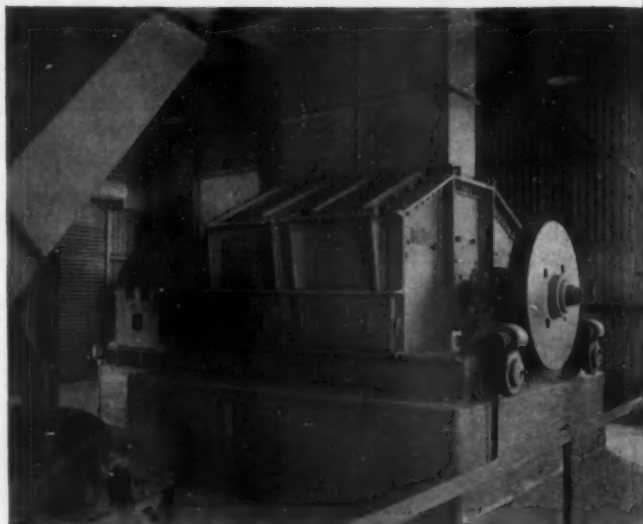
have established an outstanding reputation, in the rigorous service of preparing Steam Shovel size Limestone, Cement Rock, Metalliferous Ores and Gypsum, for secondary crushing—dry, damp or wet, at minimum upkeep cost and power demand. Nine (9) sizes afford broad capacity range.



PENN-LEHIGH Primary Single Roll Crusher, size 36"x60",—preparing steam shovel size, hard limestone and cement rock,—choke fed from quarry cars, for secondary reduction in "Pennsylvania" REVERSIBLE Hammermill.

For over 15 years this STEELBUILT Primary Single Roll has rendered uninterrupted service without repairs or replacements, aside from occasional tooth welding for wear compensation.

The massive STEELBUILT Hopper shows no distortion, and in spite of the long free fall of the rock, the original special steel liners show but slight abrasive wear.



"PENNSYLVANIA" REVERSIBLE HAMMERMILL, serving the world's latest Cement Plant, with the fine secondary preparation of the Cement-making materials essential for highly efficient grinding.

In this advanced type, major reduction is made by smashing impact,—and in alternate right-and-left-hand operation,—Hammers and Cage Bars are automatically turned and resharpened,—capacity is increased and power demand reduced,—products are finer and more uniform, all factors which make for higher efficiency and sharply cut overall operating cost.

Our Engineers are at your service for cooperative study of Raw Side Crushing Problems, and equipment recommendations.



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Associated with Fraser & Chalmers Engineering Works, London

# STEELBUILT CRUSHERS

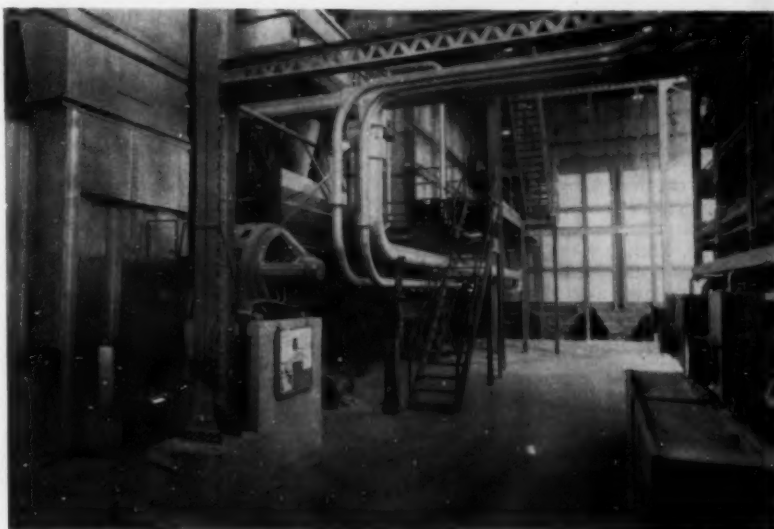
where they could be served by water or truck transportation.

The opinion seems to be that so-called "chain-plant" companies with plants strategically located will have an advantage in competition under a fixed mill base price system, and this very likely, if true, would lead to consolidations and fewer competitors. In other words, it would make the big companies bigger, and tend to destroy the small independent manufacturer. This is not the professed objective of present administration economic planners, but it appears to have been the result of most of their experiments.

Developments in the beneficiation of limestones and other cement ingredients have made it possible to place plants in locations hitherto rejected for want of satisfactory raw materials. This is also a factor that must be considered in developing plans for the post-war period. For example, in the case of far-west irrigation and power projects, with the Federal Government the sole purchaser, there is a strong possibility that temporary cement plants may be erected to serve these construction jobs exclusively, just as aggregate plants are now erected. Such cement plants have been built in the past for similar projects. It will be the concern of the cement industry to see to it that such production is kept in the hands of private industry by contract with established and experienced organizations, rather than fall to new government bureaucrats.

#### Possible Changes in Plant Design

It used to be quite generally accepted that 20 years constituted the life of a cement plant; that while various additions and improvements could keep the plant sufficiently up-to-date to make an acceptable product, the chief asset of a plant 20 years or more old, was the fact that in this period most if not all its original cost could be written off, and hence it had an advantage over newer plants in reduction of its overhead (bookkeeping) cost, or possible temporary suspension of its fixed cost. This is a distinct advantage in times of stress when prices sag and out-of-pocket costs are all important. This also has been an important factor in plant design, as for example, whether or not to put in long kilns and buy power, or put in waste-heat boilers, or a separate power plant. Where easy money or earned surplus was available to put into power plants, obviously the cement plant which made its own power would have a smaller out-of-pocket cost than the one which purchased power. This condition is accentuated by the nature of power company rates where high demand charges are an especial handicap in periods of low production. Consequently, we find



An example of modern waste heat boiler plant installation, complete dust collectors, at Aisen, N. Y., plant of Lehigh Portland Cement Co.

companies considering or planning waste-heat power units at plants which have hitherto purchased power.

This condition also poses a problem for manufacturers who have waste-heat power plants 20 years or more old. These are not only wearing out, but tremendous steps in the efficiency of steam-power generation in those 20 years have rendered many of these installations obsolete as power plants. The decreasing efficiency of these old waste-heat power installations has been accompanied by a demand for increased power consumption, caused by finer grinding and installation of new equipment not contemplated in the original design.

Whether to build or rebuild waste-heat power plants, or to abandon the idea of waste-heat power and build a modern, separate and distinct power plant with high pressure superheated steam and all the other economies possible in a modern steam-power plant, or a modern Diesel-power plant, designed to produce electrical energy at the lowest possible cost, is a live problem in the cement industry at this moment. Some claim that the over-all fuel consumption is no more for separate kilns and power plant than for kilns with waste-heat boilers. One fact appears to be fairly well established, although cement company executives hate to admit it, and that is a general practice of adding a few extra pounds of fuel, over and above that required for making clinker economically, to provide for the necessary "waste-heat" power.

One thing is certain. All manufacturers now recognize that the primary function of a rotary kiln is to make a uniformly satisfactory product and not power. Hence, any waste-heat

installations that may be made in the future will be modeled after that at the Northampton, Penn., plant of the Universal Atlas Cement Co., where each kiln and boiler constitutes a separate unit, with no cross flues or interconnections. However, the Northampton design of waste-heat boilers and kilns as separate units, is not new. The first plant so built, we believe, was the Peerless Portland Cement Company's Detroit, Mich., plant in 1925 (Rock Products, September 5, 1925). This means that there must be a good-sized auxiliary boiler, fired independently of the kilns, in order to provide necessary elasticity in power demand. That obviously is one step toward a separate and distinct power plant. Manufacturers who have old waste-heat power plants are in some instances sealing up the cross-flues and attempting to operate the separate boilers and connecting kilns as single units, and in other instances are contemplating this step. The reason for this is that with the necessity for close control over burning conditions in the kiln, satisfactory draft and combustion conditions can not be had except by the elimination of cross flues and connections.

It is said that local conditions will determine the solution of whether to put in long kilns and no power plant, or a separate power plant, or to use shorter kilns, with slurry filters in the wet process, and a waste-heat power plant. There does not seem to be any question about satisfactory clinker being made in kilns of any reasonable length, wet or dry process; and kilns are, and probably will continue to be, designed either for fuel economy or for capacity production. Likewise, any length of kiln can be operated for fuel economy or for



capacity output. The two do not go together. Where two 200-ft. kilns are joined to make one 400-ft. kiln, a very considerable saving in fuel can result, but the capacity of the single kiln will be appreciably less than that of the two former kilns, if the desired fuel economy is achieved. Merely increasing the length of a kiln is not the important factor in increasing its capacity. Diameter must also be increased. The very long kilns which have alleged capacities of 3000 bbls. per day and over also have diameters in the neighborhood of 12 ft.

### Modernization to Continue

Aside from the changes outlined, designed to effect fuel and power economies, there are no major changes contemplated in existing plants other than a continuation of modernization programs which have long been in effect, and in some instances will mean practically new plants to replace old ones. These changes include installations of up-to-date clinker cooling and cement cooling equipment, more resort to separate grinding units in closed circuit, more refinement in methods and equipment for proportioning and feeding raw materials and more effort to get cleaner and more presentable plants generally.

The Northampton plant of the Universal Atlas Cement Co., which nearly all American manufacturers have now inspected, has been an eye-opener in the possibilities of making cement plants agreeable places to work in. There are numerous comments on its cost and the alleged complicated processing, but only praise for the plant as a whole, as a really attractive manufacturing institution. This is largely for the reasons pointed out in our story on the plant (November, 1943) that there is plenty of floor space and headroom, and that the plant is very well lighted, bright and clean. As one cement executive recently remarked, "You had to be a monkey to get around in the average old plant."

Besides the changes referred to in processing equipment and machinery, according to general opinion, the first major improvements in the post-war period will be in the pack houses. Here is the place where most of the labor complaints and difficulties come from, and such plants as that at Northampton have shown that it is no longer necessary to make men work under such disagreeable conditions.

Further, in connection with the post-war handling of labor in the cement industry, many executives be-

lieve labor saving one of the prime objectives of contemplated plant changes and improvements. This objective is not so much to save in the total number of employees, as it is to utilize their labor more effectively, which is a function of both management and equipment. For example, the opinion was expressed that there is the prospect of guaranteeing an annual wage, based perhaps on a 36- or even 30-hour week, which will be approximately the same as for the present 40-hour week. Under the present war conditions, with much new and unskilled labor, the labor cost of a barrel of cement has risen to nearer one-third of the whole cost, than the one-fourth that was considered normal. This condition must be met by better skilled workmen and by more effective supervision. Hence forward-looking manufacturers are preparing regular training courses for young men of management caliber—in most instances men with technical educations, but primarily men who know how to handle other men.

### Survey of 20 Years' Progress

A review of developments during the past 20 years shows that plants built within that period are far from

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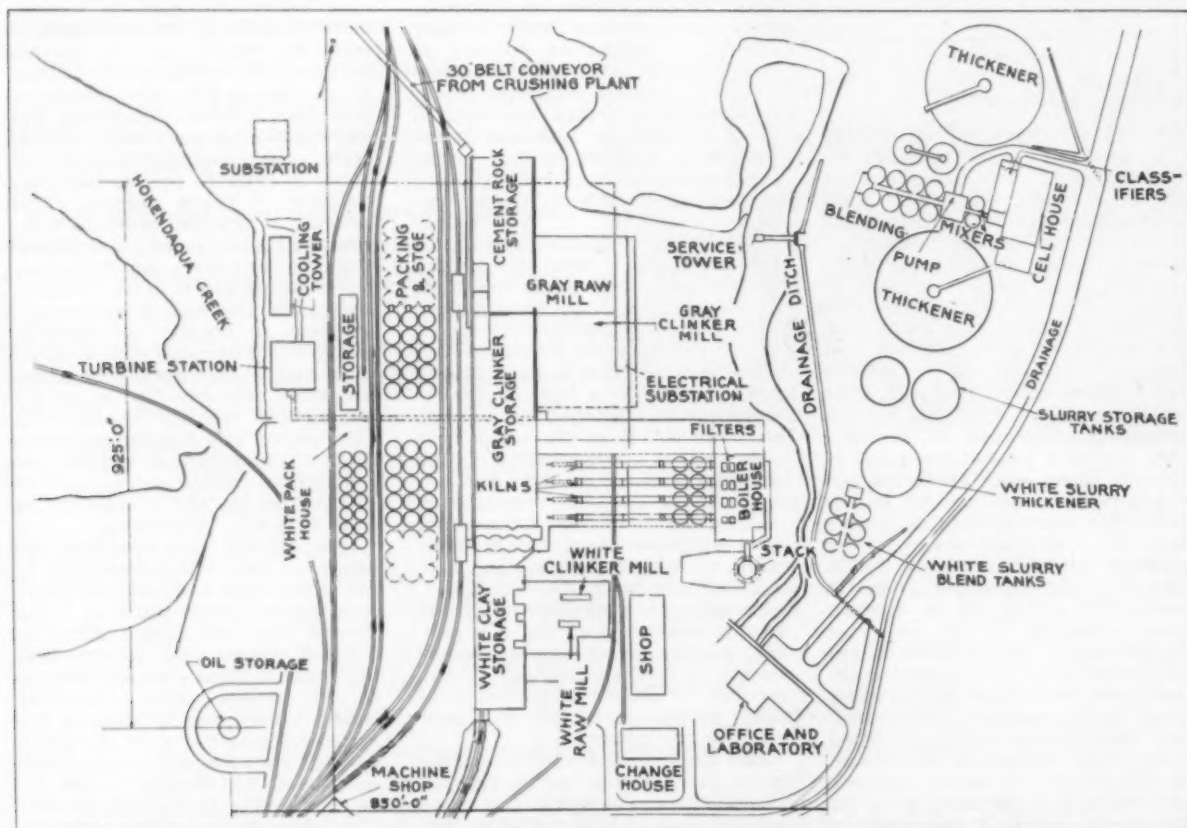


Fig. 3: General plan of the recently completed Northampton, Penn., plant of the Universal Atlas Cement Co.

# CEMENT SECTION

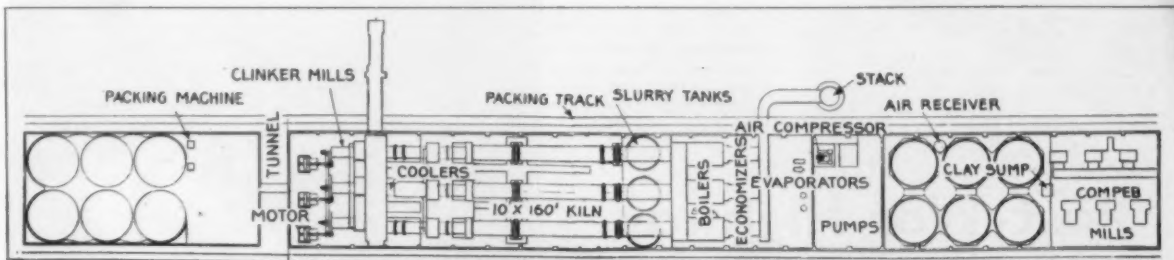


Fig. 1: Plan of Manitowoc Portland Cement Co. plant at Manitowoc, Wis.

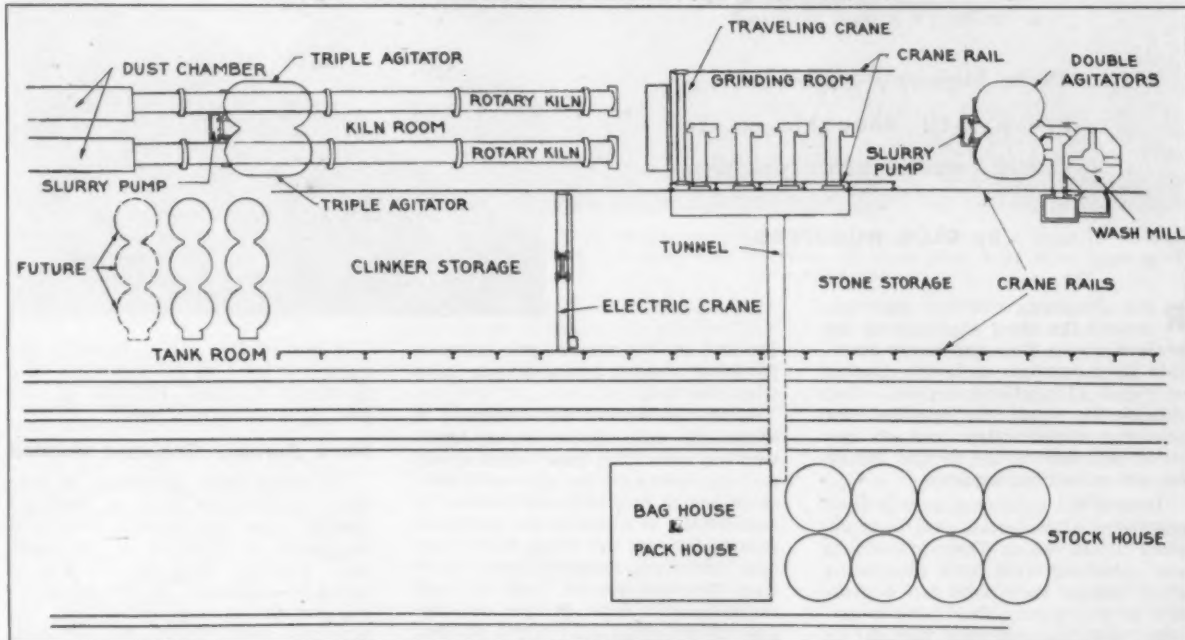


Fig. 2: General plan of the Standard Portland Cement Co. plant

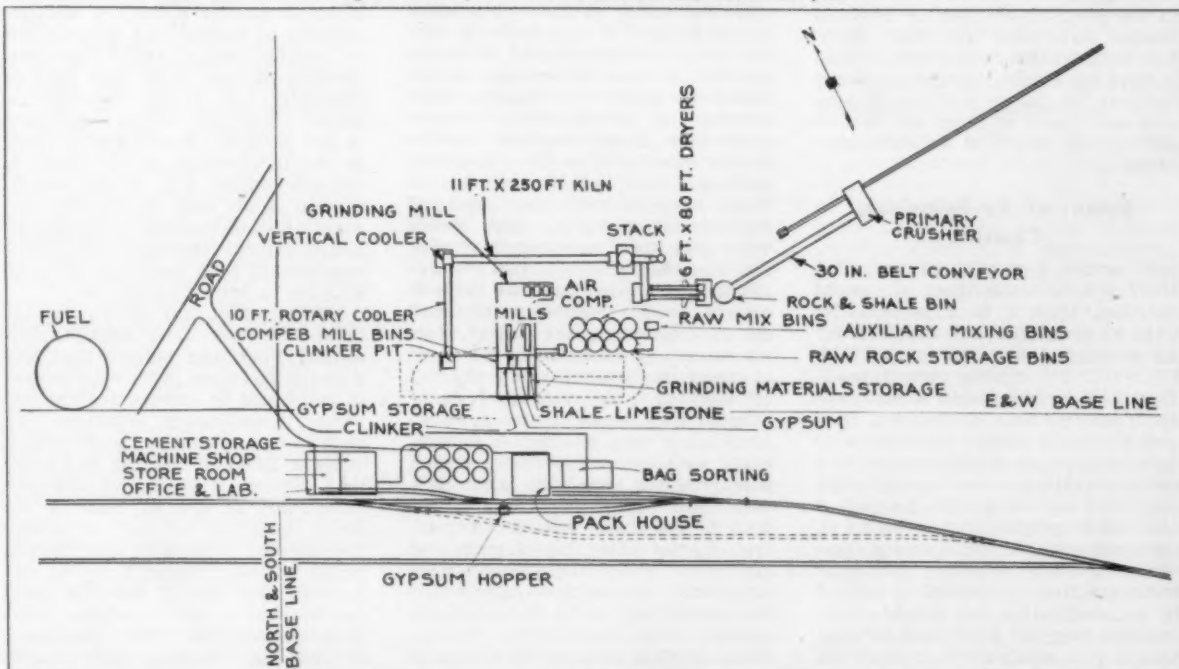


Fig. 4: Plan of the Waco, Texas, plant of Universal Atlas Cement Company

Pennsylvania Turnpike superhighway between Harrisburg and Pittsburgh comprises two 24-ft. lanes

## Post-War Highway CEMENTS

State highway engineers express their thoughts as to cement needs after the war

By BROR NORDBERG

**R**OCK PRODUCTS' editors questioned the chief engineers of the State Highway Departments to ascertain their opinions as to the number of types of portland cements that should, or would, be specified for post-war construction and to get their impressions as to the future for air-entraining cements.

Most of the chief engineers or their engineers of materials and tests replied to our letter. Their answers to our questions were very interesting even though they were not conclusive by any means. One thing is certain, that considerable thought is being given to durability of concrete in the selection of types of portland cement to be used. The State Highway Departments do not believe there is need for a great number of special cements for this or that special purpose and many of them are not yet sold on the merits of air-entraining cements.

### Future of Air-Entraining Cements

It seems generally agreed that there will be seven types of cement specified, types I to V of A.S.T.M. C150-42 and types I-A and II-A for air-entraining cements in A.S.T.M. C175-42T, but in most cases types I, II and III were reported as sufficient for highway construction needs. Several states will restrict their demands to normal portland cement and high early strength portland cement while in a few instances types I-A and II-A also will be provided for in setting up post-war cement specifications. One southern State definitely will have moderate heat of hardening cement in its specification and several others indicate they will have need for that type if it is available. It is expected, of course, that W.P.B. will remove

the ban on the regular five types of portland cement, probably not later than this fall.

As to air-entraining cements, it seems generally agreed among highway engineers that these cements will find increasing use for pavement construction, in fact, a heavy demand is anticipated in some of the northern States. But, on the other hand, several engineers reserved their opinions. Whether or not they will use these cements depends upon the degree of reduction in strength of concrete made from these cements and upon the ability of cement manufacturers to furnish such cements that will bring uniform results in actual service. A good percentage of the engineers prefer to reserve their opinions of air-entrained cements until they have completed experiments under field service conditions, although they admit that use of these cements will likely increase considerably, if for no other reason than that these cements have special desirable qualities that are aggressively merchandised. We know of several cement manufacturers that are recommending the use of their air-entraining cements for all types of structures, but the great majority of highway chief engineers doubt whether they should be used in structures other than pavements. Experience with air-entraining cements possibly could alter their opinions a year from now. A few, however, intend to use these cements for concrete at the water line on piers and abutments or for highway drainage structures. One engineer mentioned the possibility of using air-entraining cements in concrete bridges or other types of mass concrete to eliminate the rising of water in the forms.

A few of the letters received are quoted, in part, in the following. The materials engineer for one of the New England States said:

### More Durable Cements Needed

"It would seem advisable, if possible, to limit the types of portland cement from the present five to a maximum of three or at the most four. Possibly Type II, IV and V could be combined. As far as highway construction is concerned, the principal requirement of our own Department would be a portland cement of greater durability and resistance to scaling and damage due to winter maintenance, freezing, thawing and so forth. This item of durability and greater resistance to winter conditions is very important in the northern States and requires as much attention on the part of concrete design and cement manufacture as the item of strength. Apparently great strength is not enough and at present does not bear a direct relationship with durability and resistance to winter conditions.

"With respect to air-entraining cement, we have done some experimental work and believe that this material has some merit with respect to resistance to surface scaling and winter maintenance. However, we have secured equally good results using a blend of natural and portland cement. It is possible that developments of one or both of the above materials will aid in solving the present difficulties encountered in the northern States. I see no reason why this type of material could not be used in all out-of-door concrete construction where resistance to freezing, thawing and general weathering is a factor.





"Summing up, it appears evident to us that the greatest improvement needed in cement concrete construction is cements which will make concrete more durable and much more resistant to freezing and thawing, winter maintenance of highways, and a longer life in cold climates."

The chief engineer of another New England State wrote:

"Regarding air-entraining cements, I am, personally, not sold on the idea. There may be a spurt for a time in their use for pavement construction in northern latitudes, but I question whether they will be on the market for an extended period of time. As far as utilization in structures is concerned, I believe that the reduced strength of concrete will preclude their general use."

The research supervisor for the highway department of a northwestern State remarks as follows:

"It is our opinion that the portland cement types I, II and III will meet the average requirements for post-war highway construction in this State. The low heat type IV and the alkali resistant type V will seldom if ever be used. In some areas where extreme alkali conditions prevail we may feel it desirable to specify a high-alkali-resistant cement."

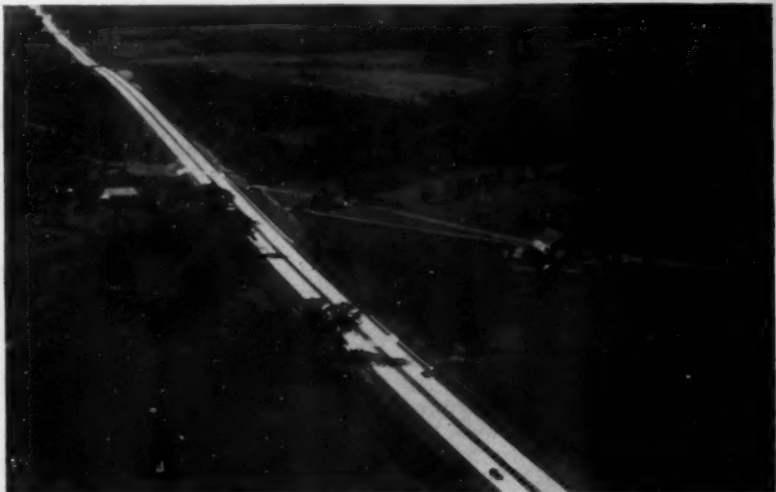
"At the present time we understand there is some difficulty in obtaining proper control when using air-entraining cements. This may be due perhaps to the effect of different types of aggregates upon the air-entraining agents. However, we see no reason for believing that additional research and experience will not eventually overcome these difficulties."

"We believe air-entraining may prove to be a compensation in some instances where it is necessary to use inferior or questionable aggregates. It is very likely air-entraining will never serve as a substitute for what has already proven to be good concrete technique. Air-entraining properly controlled, as we understand, will incorporate in concrete desirable properties that are additional to those attained by selection of the best available aggregates, appropriate cement type, dispersing agents, and proper design."

"If air-entraining will make concrete more resistant to freezing and thawing and at the same time more workable, we believe it will eventually be used in other structures than pavements."

The engineer of materials and construction for a Midwestern highway department gives full recognition to the cement manufacturer's problems in his reply to our letter. He said, in part:

"While I know little about the cement chemist's problems I suspect that they are so complex that it is



High speed Pennsylvania Turnpike highway which is expected to serve as a model for postwar superhighways such as those planned for New York, Illinois and other states having heavy automotive traffic

not always wise to ask him to change the characteristics of his product frequently or suddenly. I doubt that we know enough about the chemistry of concrete to prescribe great changes in the cement without the benefit of long time observations of the effects of such changes on the behavior of concrete."

"I remember some of the discussion which took place during the meeting of A.S.T.M. Committee C-1 in 1928 or 1929 when the revisions to Specification C-9 which became effective in 1930 were under consideration. It was proposed to change the specifications to require considerably higher strengths at early ages. The late Dr. Talbot called attention to the fact that we knew something about the durability of the concrete made with the cement that we had been using. He asked if anyone knew what effect the proposed changes in specifications for cement would have upon the durability of concrete. I do not recall that anyone present had a satisfactory answer to his question. The requirements as to early strength were changed. This resulted in some changes in the manufacture of cement. From examination of concrete made before 1930 and that made since that date I am inclined to believe that the older cement produced more durable concrete than that which has been manufactured since 1930."

"It seems to me that in recent years the designing engineers and testing engineers have so complicated the cement manufacturing problem by demanding several types of cement that I doubt that all cement plants can produce all the types specified and be at all certain that all will produce durable concrete. Therefore, I would hesitate to specify types of cement other than those

with which the manufacturer has had considerable experience."

"We have had no field experience with the use of air-entraining cements and practically no laboratory experience with them. I understand that the principal advantage which may be expected from their use is to inhibit the tendency of concrete pavements to scale, particularly where salts are used for ice control. So far such scaling has not been a serious problem in this State. Perhaps this is because our program of ice control has not been as intensive as it has been in other places. I doubt if we would be justified in accepting the reduction of strength of concrete which accompanies the use of such cements in many locations."

#### To Specify Use of Recording Pyrometers and Autoclave Tests

A materials and testing engineer in a southeastern State had this to say:

"You inquire whether we believe there will be three or five types of cements specified for post-war construction. I believe there will be seven standard types which will include Types I to V of A.S.T.M. C 150-42, and Types I-A and II-A covering treated (air-entraining) cements as specified in A.S.T.M. C 175-42T. Of these seven types only Type II and Type III will be used in this State according to present plans. There are no local conditions here to recommend any other special type of cement, and we do not feel that Type I cement requirements are sufficiently restrictive to insure the most satisfactory and consistent results."

"The preceding paragraph answers the question of types as asked in your letter. In discussing the matter of specifications, however, I should

(Continued on page 132)

## Post-War CEMENT MILL

**T**HE PORTLAND CEMENT INDUSTRY is taking full advantage of the current lull in construction, following several of the heaviest production years in its history, to lay the ground work for its post-war operating practices. The industry as a whole has recognized the shortcomings in its production methods and facilities, judging from what top executives tell us of their problems.

Some definite trends in manufacturing principles had taken shape just preceding the war, which will continue, and some new plans have developed since which we expect to see put into practice.

The overall picture is somewhat complicated by new demands to be made upon mills for new cements and uncertainties as to exact customer requirements but there are two main objectives which will be sought by all cement companies in their operations. One is to improve the quality of their portland cements to better serve the construction industry. The second is to tighten up on operating costs by economizing in all processes that enter into the manufacture of portland cement. As one operating executive expressed it, the industry as a whole has gotten itself into the habit of high speed production without sufficient regard to costs.

Neither of these two main objectives will be attained without considerable revamping and modernization of production facilities. The first general objective, improved quality,

**Economies of operation, along with high quality are principal objectives of operating officials**

**By BROR NORDBERG**

is concerned with better control of many processes that enter into the manufacture of a barrel of portland cement, including the selection, preparation, blending and proportioning of the several raw materials and more accurate control of the calcination process in the kilns. The latter would involve, of course, more knowledge and control over kiln firing conditions, accurate methods of feed, accepted methods of cooling the portland cement clinker and its proper conditioning for grinding into portland cement of high quality.

Labor, fuel and power are the three major items of cost and they are all coming in for considerable study. Labor absorbs approximately one-third the manufacturing cost of a barrel of portland cement, which is about one-third higher than it used to be. There is little hope of a return to more normal wage levels in the immediate future so the industry is studying ways and means to more effectively utilize labor. Older mills have a comparatively high labor cost and, during the war and immediately preceding it, the industry has experienced a condition under which, generally speaking, less

work has been accomplished per man-hour than previously had been realized.

Fuel costs per barrel of portland cement are slated for reduction as one avenue of holding down overall costs and prices of portland cement to levels favorable in competition with other structural materials. Coal and other fuels cost much more than they did a few years ago and there is little likelihood of much reduction in price, so the only alternative is to burn less of it per unit of production.

Power costs are a very live subject among cement men, particularly to those who operate waste heat boiler plants, and we may expect considerable investment to make available low cost electrical power.

### Post-War Thinking in the Cement Industry

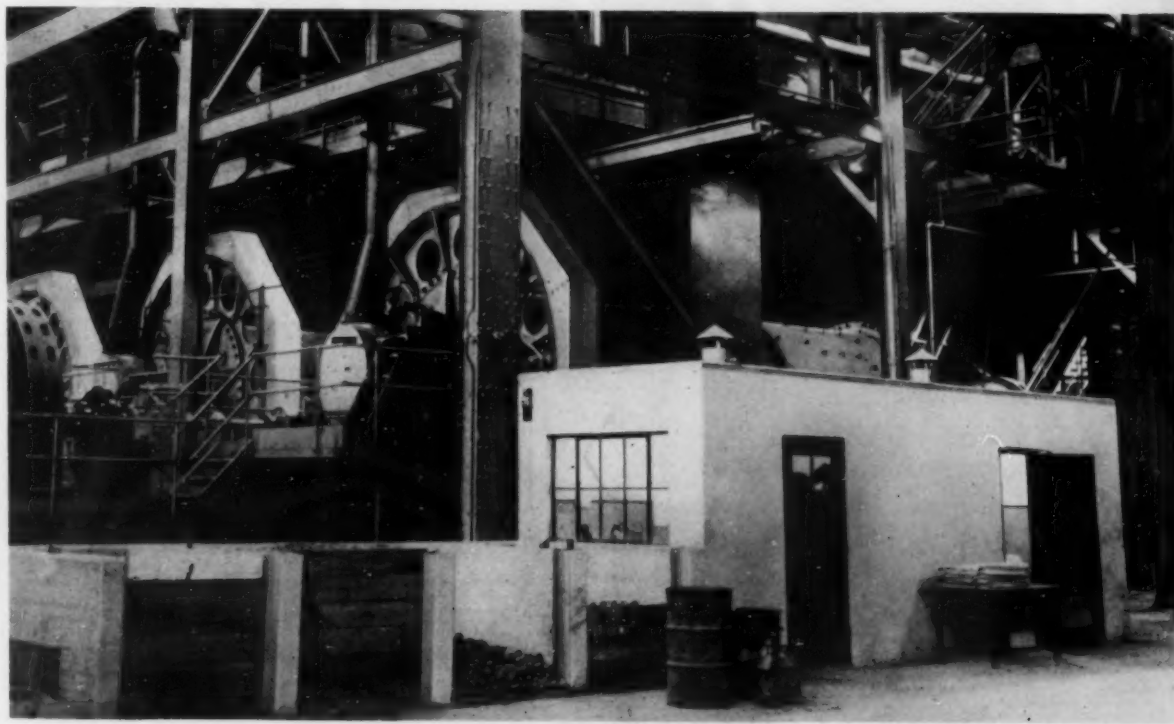
The foregoing remarks are general, to be sure, but they represent a summary of the opinions of leading cement executives. With some concerns, much is still in the speculative stage, others are waiting to see what types of operating changes are to be

(Continued on page 85)

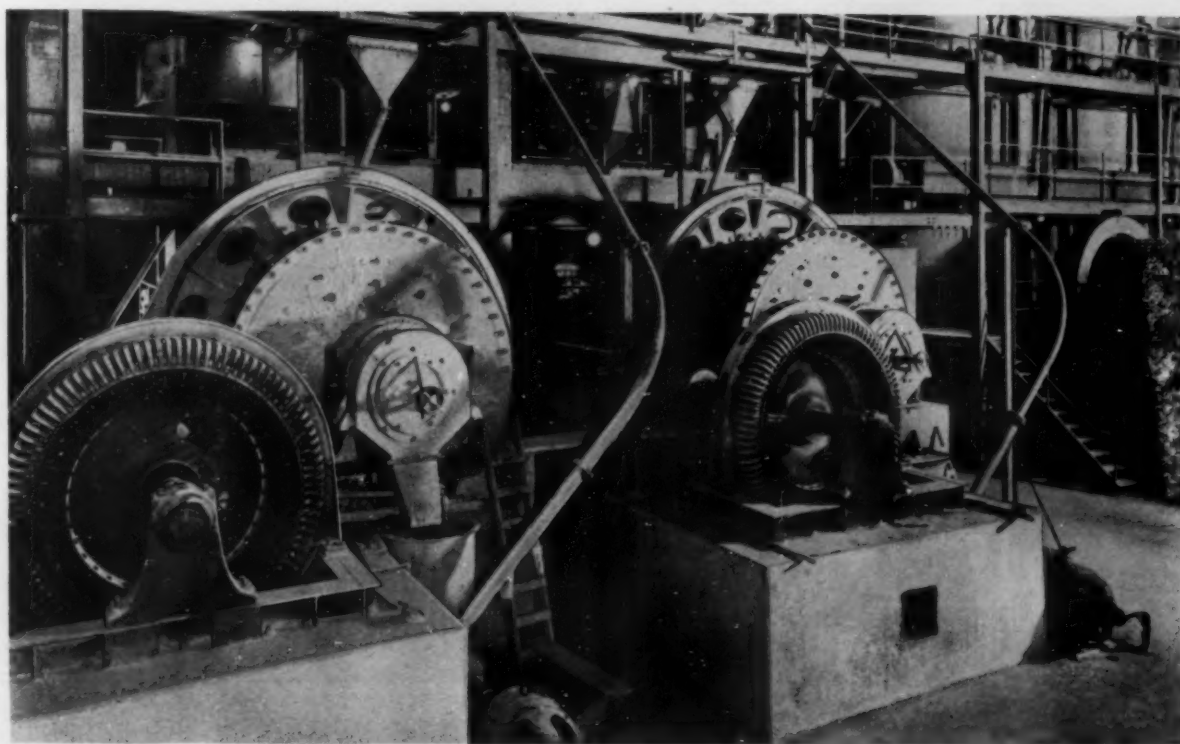


Raw material blending system at Marquette Cement Manufacturing Co., Cape Girardeau, Mo. Left: Double-deck drag conveyor under four clay "homogenizing" tanks. The discharge is simultaneous for transportation back to receiving tank and recirculation. Right: Drag conveyor under the five proportioning scales to carry batched materials on to grinding mill bin

## CEMENT SECTION



Latest in finish grinding are these mills in closed-circuit with mechanical air separators at Northampton, Penna., plant of Universal Atlas Cement Co.



Typical of up-to-date practices in raw grinding is this installation of wet grinding mills in closed-circuit with electric vibrating screens at the modern Des Moines, Iowa, plant of Marquette Cement Manufacturing Co.



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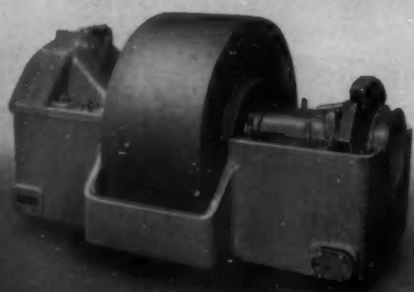
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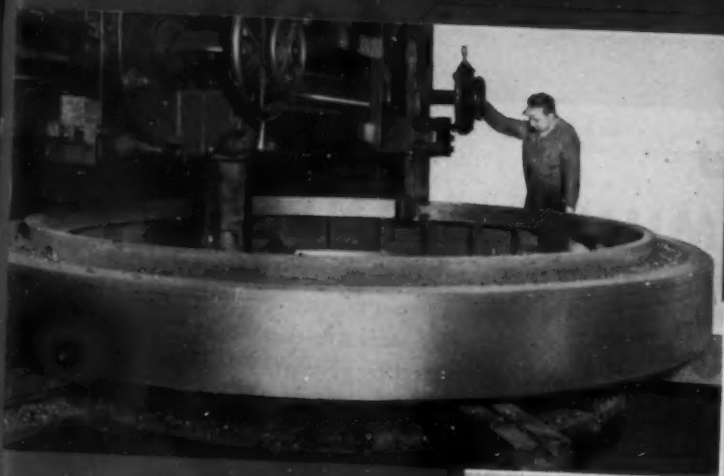




Vulcan Supporting Roller Assembly with one bearing cap removed to show oiling bucket and oil trough. Journal bearings have full 180-degree bushings at right angles to direction of pressure. Roller is 48 to 56 carbon steel, cast in our own steel foundry and shrunk on forged steel shaft.

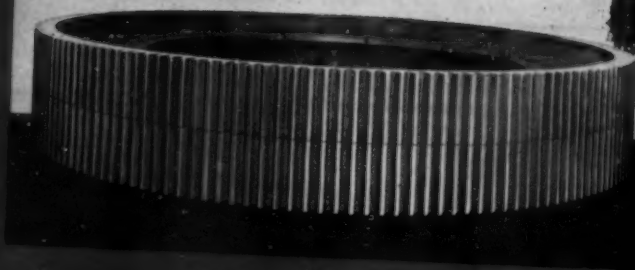


Complete assembly of latest-type Vulcan Supporting Roller Bearings and Thrust Bearings. We are equally prepared to furnish replacement parts or complete assemblies for the older low-roller, grease-lubricated, type of Supporting Bearings.



Turning cast steel tire for 10 ft. diameter rotary cement kiln in Vulcan machine shop. Much larger tires, either solid or sectional, can be cast in our steel foundry and machined on our large boring mills.

Two 16'-diameter ring gears for 10 ft. diameter rotary cement kiln being cut simultaneously in Vulcan machine shop. Spur gears up to 20 ft. pitch diameter and 40'-diameter can be cut on this machine. Smaller gears are cut on automatic machines of a different type.



Vulcan Shell Sections can be arranged for either field welding to the old sections of the shell or, if preferred, for field riveting to present circular butt straps. Shell sections can also be furnished complete with flanges and reinforcements attached to the section.

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Plant of the Calaveras Cement Co. at San Antonio, California which is supplied with grinding balls made by the American Forge Company.

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SINCE





## CEMENT SECTION

(Continued from page 80)

made by their competitors and many already have definite plans ready to be put in effect when the machinery and equipment become available.

It is doubtful if the industry has ever gone through a period when it has been so alive in its thinking and planning. Operating executives have been studying in detail the newer plants like the Universal Atlas Cement Co. mill at Northampton, Penn., (see *Rock Products*, November, 1943, pp. 35-80), for ideas that they can incorporate into their own mills. The first machinery installations of any consequence in the post-war period will be viewed with great interest by some of the conservative concerns which prefer to wait and see what some of the others will do.

Much of the post-war planning going on in the industry is vague and general so far, so we will attempt, in this article, to summarize some of the definite plans and point to some specific installations that we know will be made. We base these "trends" and point to modernization programs from information obtained in interviews with operating executives and from letters received from presidents of cement companies in response to our request for information. In nearly every case the interviewed operation's executive not only gave his views but those of others with whom he evidently had had considerable discussion. Several so-called "chain-plant" companies as well as smaller concerns with single operating units were visited.

The head of operations for a large concern with multiple plants, said it is the opinion of many cement company executives that cement plants are due for a complete change. He was referring to the older mills built 20 years or more ago, of which there are many, that originally were designed and built to produce a single type of portland cement during times when land, fuel and labor were cheap. These plants are entirely outmoded, he said, since they have been adapted to the manufacture of three or five types of portland cement by a process of adding equipment and buildings here and there, to the point of ending up with a sprawling establishment that has too much lost motion to be efficient. Many of them produce an acceptable product but operating costs are necessarily excessive. There no longer is a basic system of layout essential to low cost handling, of course, and the only solution for some of these high cost mills is modernization practically to the extent of rebuilding the plant.

It is the opinion of some executives that the attitude of labor will have a pronounced influence on post-war operating methods since, as mentioned earlier, labor is no longer a



Operator releasing materials for weighing, Marquette Cement Manufacturing Co., Cape Girardeau, Mo. Note numbering system and identifying cards for records of each batch

small item of cost. There will be a demand, they believe, for a new type of mill supervisor: men of higher caliber, for each operating department.

They have reached the conclusion that there are far too many men in the mills called "operators" who do nothing more than stand around to see that operations are going well. When troubles develop, they report it, and someone else has to correct the difficulty. It has been suggested as a solution, by operating executives, that mills be equipped with more mechanical devices which can be counted upon for accurate controls of processing, and this better class of workers should be organized into highly skilled maintenance crews to keep the mills in A-1 operating condition.

The post-war cement mill will be a neat-appearing, cleaner place in which to work if what we hear is any criterion. We would say that such a mill would do much to attract the better class of worker whom some executives evidently desire. There would be the added advantage of creating a desirable "public opinion" toward the mill and company.

One of our questions to cement company presidents sought to determine whether the industry was anticipating that higher surface area cements would be demanded of their mills after the war. The replies were about evenly divided, although most agreed (and highway engineers do too) there was no need for finer grinding than is required today except to meet competition.

A number of executives expect that cement fineness of grind will be a serious competitive tool in the post-war market. In many cases they are

influenced by the fact that their own companies, or competitors, are now grinding cement up to 2000 surface area and selling it as standard portland cement without a premium price. One affected executive made the suggestion that the setting of top and bottom limits on surface area for each standard type of cement might be a solution. However, it is not in our province to comment on this subject but, one thing is certain, the mill with the most economical grinding department will be in the best competitive position, other factors being equal. The trend toward increasing use of closed-circuit grinding circuits, where economy of operation is desired, will continue after the war.

According to the letters received from cement company executives, it is almost definite that there will be a return to the five types of cement as designated by A.S.T.M. but some believe there will be more. If that happens to be the case, the most flexible, modern plant will be in the most favorable position. An operating executive remarked that a flexible plant like the new one of Universal Atlas Cement Co. at Northampton, Penn., could easily and quickly be adjusted to meet most any reasonable specification deviating from the regular types such as those which are written by certain State highway departments.

### Blending

Dry process plants have been temporarily relegated to the background, according to an operating executive who has both wet and dry process mills, not because raw materials cannot be blended properly but because the problems of accurate and

(Continued on page 89)

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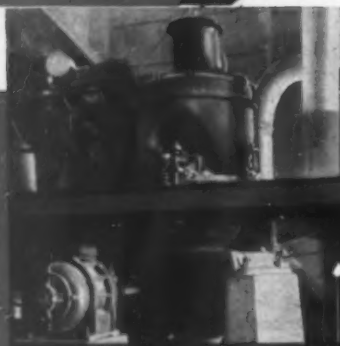
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It is the key to kiln efficiency . . . handles any grade or moisture coal . . . high availability . . . thermostatic control . . . lubrication and adjustments from outside of mill . . . noiseless, vibrationless, dustless operation.

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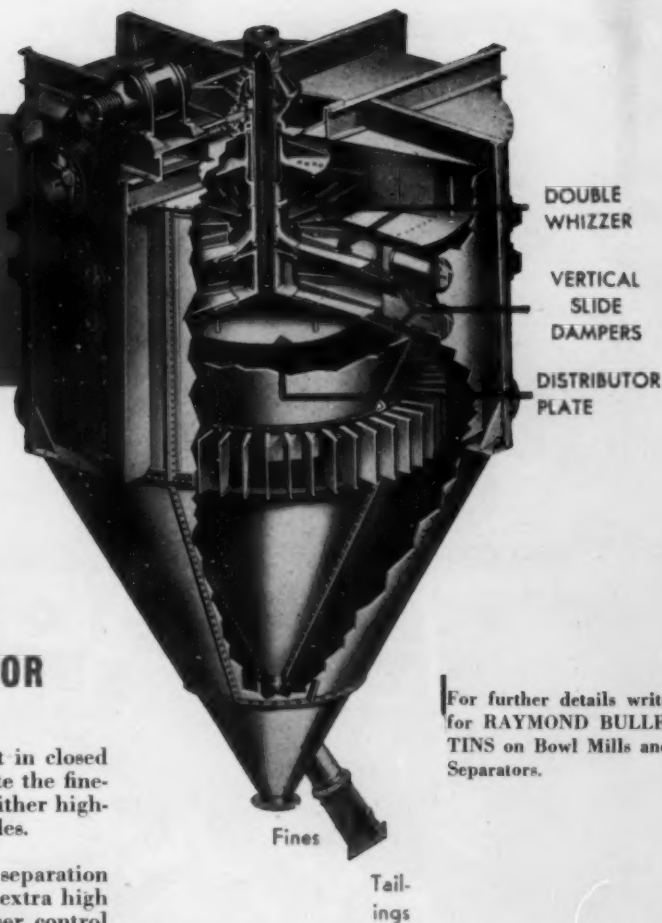
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It's the standard unit for classifying cement in closed circuit grinding operations. You can regulate the fineness by exterior adjustments for obtaining either high-early-strength cement, or the standard grades.

The double-whizzer feature insures closer separation of the fines with cleaner tailings, and gives extra high capacities at high fineness grades. For closer control of particle size and maximum surface areas, the Raymond Air Separator with patented double whizzer is consistent in results.



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COMPETENT  
ENGINEERING

## TWO-WAY ATTACK

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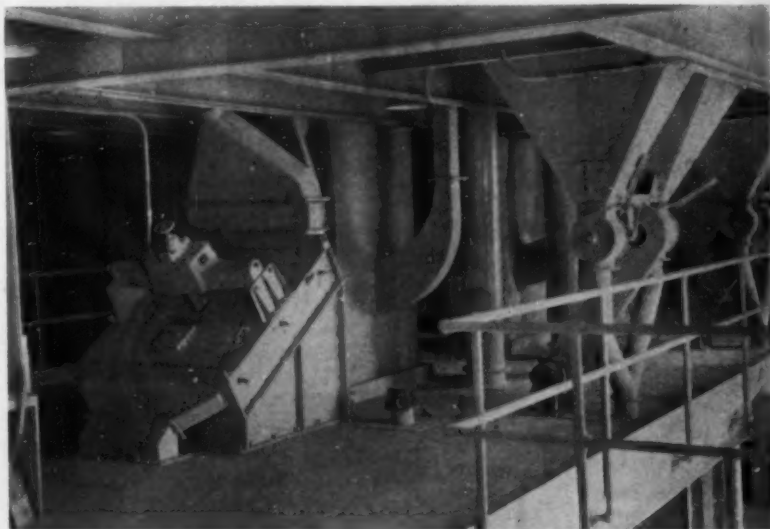
*Designers and Manufacturers of All Types of*  
**BULK MATERIAL HANDLING EQUIPMENT**

## CEMENT SECTION

thorough blending have not been solved. In his opinion many operators of dry process mills claim they blend their raw materials when they actually do not. Many of the so-called blending bins are really nothing more than storage bins, he said.

He and operators of other mills, wet process as well as dry, concurred in the belief there is a need for large storage capacities in both types of mills for raw materials, but in many small units rather than a few large bins, and adequate testing through continuous sampling, in order to eliminate variations in composition. A few large storage units are a disadvantage if there is a sudden need to change from burning one type of cement clinker to another type or if serious corrections are required.

It is also desirable, in the light of relatively recent requirements such as the autoclave test for magnesia, to have large storage facilities for the raw materials, before they are ground, as an aid to eliminating wide differences chemically in the materials. It is almost an impossibility for some operators to work a ledge of rock all high in  $\text{CaCO}_3$ , and not exceed four percent  $\text{MgO}$  in the cement made from that rock without some means of pre-blending ahead of grinding operations. A closer knowledge of rock strata composition is essential in many operations, and in recent years there has been more than the usual amount of core drill-



Enclosed vibrating screen connected to dust collector on floor above packing machine, Northampton plant, Universal Atlas Cement Co.

ing and exploratory work. Extra operations that bring about uniformity in kiln feed materials usually will be compensated for in reduced costs of kiln operation.

One of the larger concerns briefly described a raw grinding and blending mill which it will install in one of its dry process plants that it anticipates will compare favorably with wet mill performance as regards com-

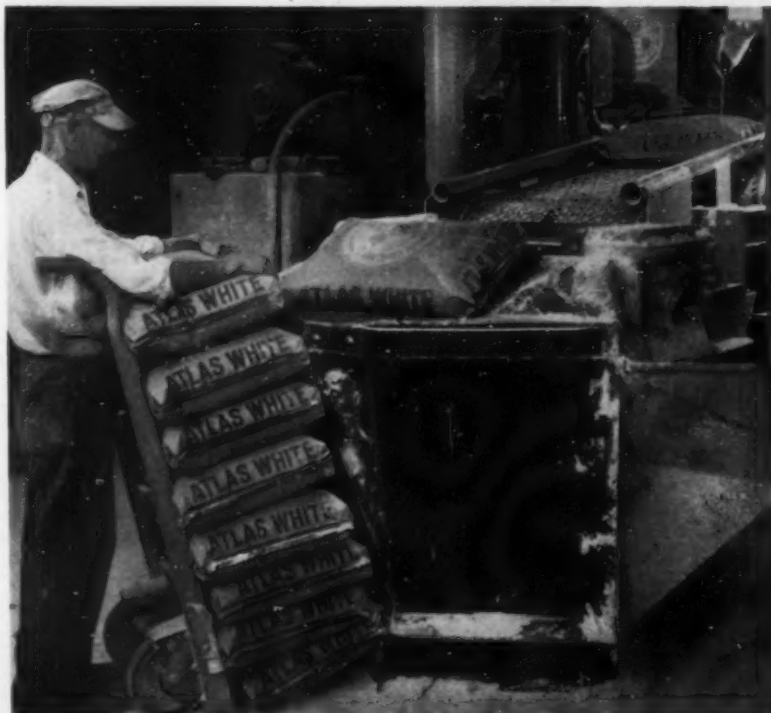
position control. Economy of operation is also an important consideration.

Variations in the grindability of the various raw materials comprising the mix are to be taken into consideration in this mill, and there will be separate grinding units for each material to eliminate the power wasted in grinding the softer materials to ultra finenesses in order to reduce the harder particles to a required size, which is the weakness in many mills grinding raw materials as a mixture. The Permanente Cement Co. and Universal Atlas Cement Co. at Northampton were the first plants to employ separate grinding circuits for the different raw materials to reduce grinding costs and stack losses, and evidently there are more to come.

The limestone, clay, etc., are to be ground separately through separate ball mills which will dry the materials as they are ground. The ground products will be stored in separate small bins from which they will be fed out mechanically into another grinding mill where they will be intermixed.

Analyses of the stack dust at another mill of the same company (wet process) revealed that the dust was nearly all clay. As a result of this finding, post-war plans call for the elimination of the clay wash mill and by-passing of the kominuters to feed the clay, dry, into the tube mills.

To further illustrate the trends in raw mill design, one of the small cement companies (dry process) is planning extensive changes to increase the capacity and fineness of its existing raw grinding department and thereby to increase kiln output. The mill is equipped with compartment mills and tube mills which will



Dustless wire-mesh conveyor for handling bags from packing machine to car at Northampton plant.



Here is a long S-A Belt Conveyor equipped with SIMPLEX type carriers. From this main conveyor, traveling boom conveyors stack stone onto the storage piles shown at the left of the picture.

COMPETENT  
ENGINEERING

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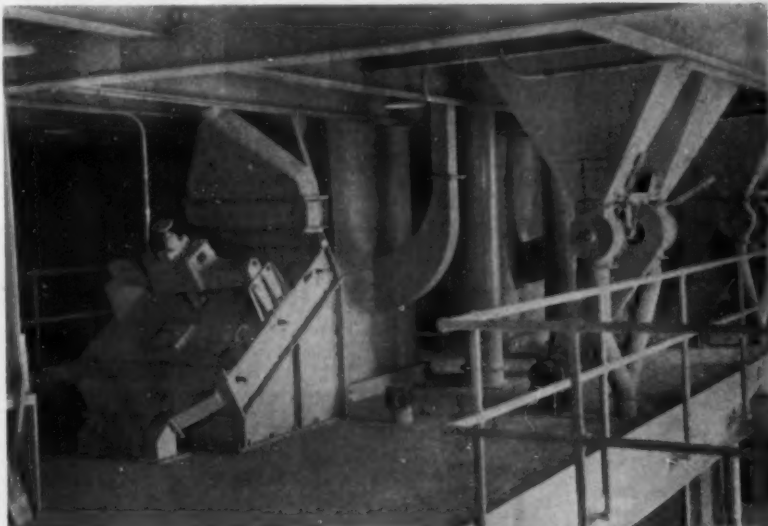


## CEMENT SECTION

thorough blending have not been solved. In his opinion many operators of dry process mills claim they blend their raw materials when they actually do not. Many of the so-called blending bins are really nothing more than storage bins, he said.

He and operators of other mills, wet process as well as dry, concurred in the belief there is a need for large storage capacities in both types of mills for raw materials, but in many small units rather than a few large bins, and adequate testing through continuous sampling, in order to eliminate variations in composition. A few large storage units are a disadvantage if there is a sudden need to change from burning one type of cement clinker to another type or if serious corrections are required.

It is also desirable, in the light of relatively recent requirements such as the autoclave test for magnesia, to have large storage facilities for the raw materials, before they are ground, as an aid to eliminating wide differences chemically in the materials. It is almost an impossibility for some operators to work a ledge of rock all high in  $\text{CaCO}_3$  and not exceed four percent  $\text{MgO}$  in the cement made from that rock without some means of pre-blending ahead of grinding operations. A closer knowledge of rock strata composition is essential in many operations, and in recent years there has been more than the usual amount of core drill-



Enclosed vibrating screen connected to dust collector on floor above packing machine, Northampton plant, Universal Atlas Cement Co.

ing and exploratory work. Extra operations that bring about uniformity in kiln feed materials usually will be compensated for in reduced costs of kiln operation.

One of the larger concerns briefly described a raw grinding and blending mill which it will install in one of its dry process plants that it anticipates will compare favorably with wet mill performance as regards com-

position control. Economy of operation is also an important consideration.

Variations in the grindability of the various raw materials comprising the mix are to be taken into consideration in this mill, and there will be separate grinding units for each material to eliminate the power wasted in grinding the softer materials to ultra finenesses in order to reduce the harder particles to a required size, which is the weakness in many mills grinding raw materials as a mixture. The Permanente Cement Co. and Universal Atlas Cement Co. at Northampton were the first plants to employ separate grinding circuits for the different raw materials to reduce grinding costs and stack losses, and evidently there are more to come.

The limestone, clay, etc., are to be ground separately through separate ball mills which will dry the materials as they are ground. The ground products will be stored in separate small bins from which they will be fed out mechanically into another grinding mill where they will be intermixed.

Analyses of the stack dust at another mill of the same company (wet process) revealed that the dust was nearly all clay. As a result of this finding, post-war plans call for the elimination of the clay wash mill and by-passing of the kominuters to feed the clay, dry, into the tube mills.

To further illustrate the trends in raw mill design, one of the small cement companies (dry process) is planning extensive changes to increase the capacity and fineness of its existing raw grinding department and thereby to increase kiln output. The mill is equipped with compartment mills and tube mills which will



Dustless wire-mesh conveyor for handling bags from packing machine to car at Northampton plant.



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While the grinding mills have long been used in many industries, the rotary kiln was formerly used principally in the cement industry, but the specially designed Smidth kilns, due to their high efficiency, are now also playing an important part in the making of magnesium, manganese, aluminum, dolomite, alkali, nickel, lime, iron, tin, etc.

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(Continued from page 89)

be retained. A series of bins is to be installed for greater storage capacity of raw materials after the drying operation, probably involving many small units. Individual automatic weighing scales will proportion the separate raw materials, after each has been blended, for raw grinding. The raw grinding mill, in its blending facilities, will likely be patterned along the design of the blending system installed several years ago at the Marquette Cement Manufacturing Co. plant at Cape Girardeau, Mo., (see *Rock Products*, January, 1942, pp. 46-49). That system has been referred to as one of "homogenization" since each raw material is circulated from storage unit to storage unit, to affect a thorough blending.

This concern also is planning to increase its air separator capacity in the finish mill in closed-circuit with compartment mills. Just previous to the war it had installed a large clinker storage building and a cone clinker crusher to reduce the big pieces of clinker ahead of the preliminary finish grinding mills. This plant will practically have been rebuilt when its post-war planned installations are completed, since a new pack-house is also to be built, and the kilns in recent years had been equipped with heat recuperators and direct-firing unit coal mills.

### Calcining

There is more than a remote possibility that some revolutionary changes will take place insofar as kilns are concerned, according to what some operators of waste-heat plants tell us. Many of the waste-heat boiler installations with comparative-

ly short kilns were built 20 or more years ago and are now outmoded as power plants. All plants have had to add more and more power-driven equipment over the years and, along with increased power demands for finer grinding, many of them no longer can develop all their power requirements. The result has been more purchased power, and a tendency on the part of many mills to burn excess fuel for the purpose of generating more power.

Now that some of the boiler manufacturers claim that they can construct independent high-pressure boiler plants so efficient that power can be developed as cheaply as it is done by waste-heat boiler plants, interest is being revived in long kilns for the sake of fuel economy, along with independent power plants. On an average, the industry consumes something like 110 or 120 lb. of coal per barrel of portland cement, and it is known that, if properly-designed kilns may be operated independently of boilers, the fuel consumption can possibly be reduced to 65 or 70 lb. per barrel.

Coal, as well as labor, is expensive and the industry seems reconciled that both will get their share of the price of a barrel of portland cement in the future regardless of the amount cement prices may be raised, therefore fuel costs are bound to occupy the attention of the industry. Furthermore, a number of cement men say there is a need for better kiln linings and insulation to further reduce radiation losses through kiln shells. As a temporary expedient, at least, we know of one concern with waste-heat boilers that is now installing more efficient economizers. A

few others have indicated that existing boiler equipment will be replaced. An Eastern cement mill is converting two shorter wet-process kilns into one that will measure 11- x 356-ft. and installing a new coal mill and air-quenching clinker cooler. Annual capacity will be reduced by approximately 25 percent but operating costs will be considerably reduced.

There have been some startling advances, during the war, in equipment and supplies that the industry will use to advantage in post-war mill operation. The vice-president in charge of operations of a Midwest cement mill remarked that many advances in electrical equipment such as switchgear, wire insulation and other electrical accessories will be put to good use in his mill to step up the efficiency of the 225 odd electrical motors in service.

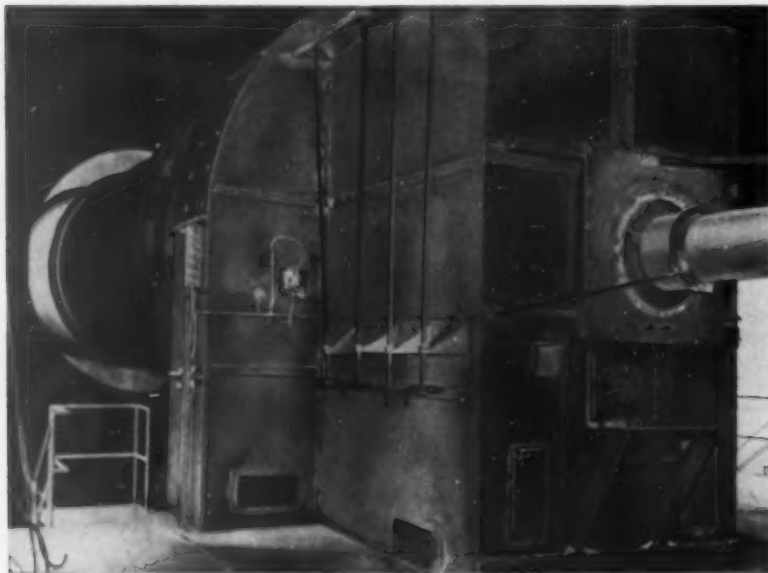
Thus far we have concentrated on major considerations but, in connection with calcination, we find that there is interest in such details as the development of more efficient kinds of slurry filter cloth than the cotton duck in common use. Cotton duck is attacked by bacteria, as is commonly known, and eventually fails through constant flexing. The heating of the slurry to around 120 deg. F. by the interjection of live steam retards the deterioration from bacteria and inhibits filterability, but cement mill executives are looking for something better. Metal cloth has been found very effective, as far as filtering goes, but the difficulty is in getting proper bending of the cloth. Glass fiber cloth has good resistance to bacterial action but so far those that have been tried cannot withstand alternate flexing as suction and pressure are applied.

One operating executive mentioned a natural rubber product that he had seen, which he believes will be the answer to filtering problems after the war. This rubber is full of minute holes that may only be detected with the aid of light.

From the number of reports we have received stating that air-quenching clinker coolers will be installed after the war, it is evident that heat recuperation is sought and that sudden cooling of high temperature clinker, for greater grindability and its favorable influence on autoclave expansion tests, will be a pronounced trend.

Dust collection is a live subject, particularly in the crushing and packing departments of cement mills which have always been the worst departments of a mill from the standpoint of working conditions. Emphasis in these departments will be more on collecting dust to make them better places to work in than for the recovery of dust for its value.

(Continued on page 95)



Firing hood for the 11 ft. 6 in. by 475 ft. kiln operated by Marquette Cement Manufacturing Co., at Des Moines, Iowa, is a good example of modern practice

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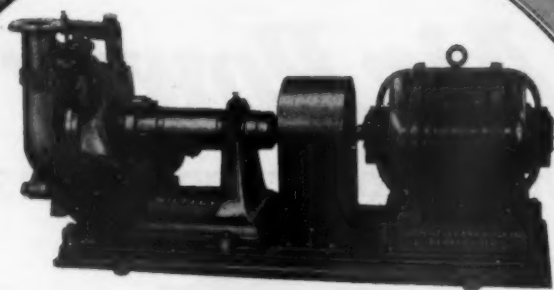
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## CEMENT SECTION

(Continued from page 92)

Dust collectors, considered efficient a few years ago, will not be up to the standards of newly-perfected designs and the industry will want to keep pace with other industries in matters of plant cleanliness. There are many outmoded packhouses in the industry and some of them definitely are scheduled for complete rebuilding, with the latest in dust collecting apparatus. Some have indicated that their new packhouses will have dustless bag packing machines and be patterned after the design in Universal Atlas' new Northampton plant. In connection with the packhouses, there will be new cement storage silos built for additional capacity and flexibility.

Employer-employee relations will assume greater importance in the post-war cement plant, and better accommodations for employees will become essential. Change houses, lockers, shower facilities, etc., will be installed in some mills. The workers will have to be educated to the use of these facilities, of course, or the investment will be wasted.

The foregoing has dealt with specific "types" of installations which will be made by the cement industry. There are others, of course. One cement company head stated that he intends to install a new power shovel for clay, to revamp the grinding mills to accommodate grinding aids, and to install new preliminary and finish mills for "specialties." Another said that 60,000 bbl. additional cement storage will be provided to handle more types of cement. Still another states that a new block of silos will be built, new type clinker coolers and a clay wash mill will be installed and a new research laboratory will be built.

Apparently, most of the wartime products manufactured in cement kilns will be dropped after the war, but several cement companies are to manufacture mineral wool, at least, for post-war construction. An Eastern mill already has purchased a cupola plant and anticipates a heavy demand for mineral wool batts for installation in post-war new homes.

### Air-Entraining Cements

Opinion among cement company executives as to air-entraining cements is well divided, although it is generally agreed that they will have wide application. Certain concerns are recommending the use of such cements for any types of structures while others are instructing their salesmen to concentrate on pavements alone. Some believe they will be "fashionable" for a few years while others believe they are a convenient means of correcting surface deterioration, not permanent, which will give place to products changed



Largest cement kiln in operation in North America is 11 ft. 6 in. by 475 ft., and is operated by Marquette Cement Manufacturing Co., at Des Moines, Iowa

basically as to composition and fineness.

It appears from plans under way and current thought that the portland cement industry will concentrate on the economical manufacture of the best portland cement it knows how to make after the war.

### Safe Handling of Fuses

MANY serious accidents in the use of explosives have been caused by dependence on the erroneous theory that blasting fuse burns "a foot a minute," states a recent Bureau of Mines bulletin. Disproving the outmoded foot-a-minute belief, manufacturers today market commercial fuse of two standard burning rates, 30 seconds per foot, and 40 seconds per foot, twice as fast as the burning rate in the old theory. Manufacturers state that the burning speeds may vary 10 percent above or below the standard rates.

The burning rate can be affected by conditions of storage, weather, method and character of tamping, change of altitude, and also by mishandling, but these factors seldom are considered by users of fuse. For an added safety factor, even when the burning rate of fuse is stated by the manufacturer, it is suggested that one or more burning tests be made, using fuse as long as that to be used in blasting. The tests should be made, insofar as possible, in the place and under the conditions to which the fuse is subjected when blasting.

Reduction of accidents due to short fusing or to mistakes in timing is possible by recognizing these factors, and also by adopting a suggested, but not entirely safe rule in assuming that any fuse may burn at a rate of

two feet a minute, instead of "one foot a minute."

Summaries of a number of accidents caused by premature blasts are discussed in the publication, Information Circular 7281, "The Burning Rate of Fuse," by D. Harrington and R. G. Warncke, which may be obtained by writing the Bureau of Mines, Department of Interior, Washington 25, D. C.

### Reactivity of Aggregates in Alkaline Solutions

A TYPE OF CONCRETE FAILURE observed in several areas in this country is now believed to be caused by excessive expansion due to reaction between certain types of rocks used as aggregates and the alkalis present in varying amounts in portland cement. The cause and the mechanism of this reaction are the subject of a study at the National Bureau of Standards.

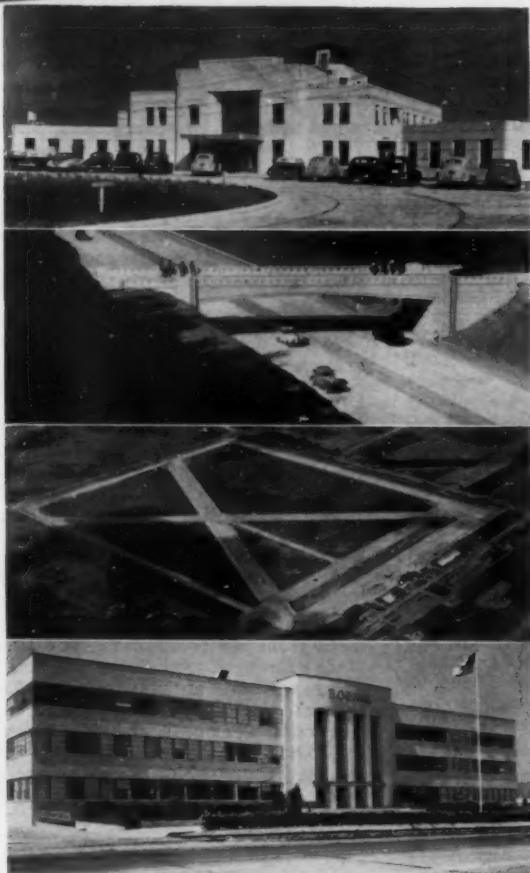
As a part of this work, a paper prepared by Leonard Bean and J. J. Tregoning for publication in the *Journal of the American Concrete Institute* gives the results of an investigation of the reactivity of various types of rocks and minerals in alkaline solutions. For example, in an accelerated test at 122 deg. C, in which the aggregate constituents were in contact with alkali hydroxide solutions, the order of reactivity was found to be as follows: Opal, chalcedony, pitchstone, rhyolite, basalt, magnesite, obsidian, calcite, limestone, dolomite, microcline, and oligoclase. The reactivities of these aggregate materials in hydroxide and hydroxide plus carbonate solutions at 21 deg. C fall in about the same order as in the accelerated test.

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ROCK PRODUCTS, August, 1944



## Post-War Cement Industry

By NATHAN C. ROCKWOOD

(Continued from page 76)

obsolete by even present standards; and during that period, when the number of plants about doubled, plants much older were kept up-to-date insofar as ability to meet competition was concerned. Obsolescence is not something that an outsider can determine. It is solely the concern of the individual owner or owners. If they can continue to use the plant to make an acceptable product in competition with other producers and at a profit, obviously the plant is not obsolete. It may be out-of-date and a high cost plant in labor, but its investment cost may have been entirely written off, and it may have a very favorable location as regards competition. It may be replaced, piecemeal, as many old plants have been, so that most of its machinery and equipment is modern.

However, the plants built in the last twenty years have one considerable advantage over older ones. They are better designed. By 1924, a great deal of engineering study had been given to the design of portland cement plants, and in the period 1924 to 1930, money to build new plants was plentiful, and in most cases neither expense nor brains was spared to build the best. These new plants, moreover, were promoted and built by men who had had experience with older plants and knew thoroughly the requirements. That very little change has been made in plant design in the past 20 years is proof that recent progress in the industry has been in details and not in fundamentals.

We find that all American plants built in the last twenty years follow one of three primary designs, or occasionally, combinations of two. The primary designs might be described as (1) straight-line; (2) parallel; (3) cross-T. The principle of the straight-line design is to assemble the plant on a single long axis, with raw materials fed into one end and cement discharged at the other. A good example of this design is that of the Manitowoc Portland Cement Co. shown in Fig. 1. As will be seen from the plan (page 77), raw mills were at one end of the kilns and the finish mills at the other. Raw storage and clinker storage are widely separated. The parallel design consists, usually, of assembling the various elements of the plant, (a) raw and clinker storage, (b) mills, (c) kilns, and (d) packing plant and silos on four parallel axial lines. Frequently in this design the axes of the mills are placed

at right angles to the axis of, and backed up against, the raw storage bins or building, so that the mill hoppers are in the storage building. Sometimes the raw mills are in a separate building, but more frequently both raw and finish mills are in the same building, placed near the center of one side of the storage building, which has raw material for approximately half its length and clinker and gypsum the other half. The whole storage building is served by one or two bridge cranes, depending on the size of the plant, which feeds or feed the hoppers of both raw and finish mills. A good example is the plan of the Standard Portland Cement Co. plant, Fig. 2. The cross-T (or H) design is illustrated best, perhaps, in the newest of plants—the Northampton plant of Universal Atlas Cement Co. (Fig. 3), where not only the raw and finish mills back up at right angles to the axis of the raw and clinker storage, but the kilns as well, so that clinker is merely elevated from the coolers over the wall into storage. An interesting variation of what we term here the cross-T plan is that of the Waco, Texas, plant of Universal Atlas Cement Co. (which it took over from the former Atlas Portland Cement Co.) shown in Fig. 4. Although the company has since added more productive facilities, including air-quenching clinker coolers, the remarkable 10- x 142-ft. rotary cooler is retained, probably as much for a conveyor as for a cooler. One other plan should be illustrated in this review, because it was developed by some very experienced cement plant engineers, and used in at least two plants. This is the plan of the Florida Portland Cement Co. shown in Fig. 5. It is one ultimate development of the cross-T design.

It is evident from a study of these typical designs that economy of material handling is the hub of the portland cement manufacturing problem, and that the method for solving it has been worked out fairly uniformly by the parallel and cross-T designs. There is little chance to improve on these designs, and obviously an efficient design is something difficult to incorporate in old plants, regardless of the sum spent for new machinery and equipment. Another advantage in plants built since 1924 is that practically all were designed in a period of rapid increase in demand, and they were so planned as to be readily expanded. This proved a great advantage in some ways, although few designers of the 20's apparently foresaw the desirability of

providing for installation of longer kilns. Hence, although much new machinery was added as demand grew, in not many instances was it possible to increase the size of the kilns.

### Competition Dictates Cement Plant Changes

One may wonder why the new plants built in 1924-25-26, even up to 1929, should have required so many changes in a few short years, for they did require changes soon after completion, and they never did have the advantages over older plants, that had been expected of them. In addition to increasing capacity, the changes and revisions in processing which had to be made were required in these new plants as well as in the old. To appreciate the reasons for this, repetition of a little history is essential.

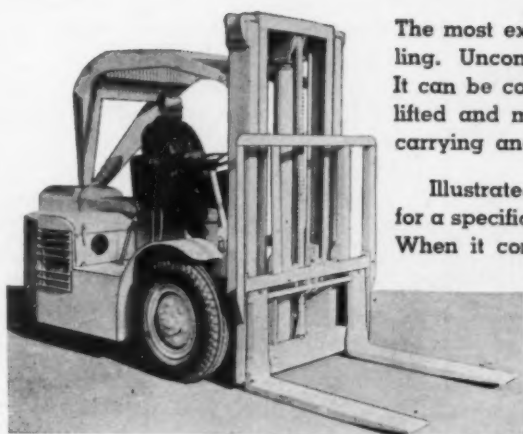
The plants built prior to 1926 or 1927 were designed to make a portland cement that had been slowly developed over the previous 50 years. It was still a mixture of calcareous and argillaceous minerals, finely ground and calcined to "incipient fusion," and the clinker thus formed ground to a fine powder. The fineness was something less than 90 percent through 200 mesh. The new plants, generally, were capable of making a better cement, and after much debate, the A.S.T.M. raised the 7-day mortar briquette tensile strength requirement from 200 to 225 p.s.i., and the 28-day strength from 300 to 325 p.s.i. It was claimed at the time that 75 percent of the cement then offered tested 250 p.s.i. or better in the 3-day test. There was obvious reluctance to set higher limits and there was too much opposition to recognize two kinds of cement—normal and early strength.

However, one aftermath of the 1914-1918 World War had been a poverty-stricken Europe, and manufacturers there were compelled to develop foreign markets. Foreign cement manufacturers entered the American market in appreciable volume not only with a cheaper, but an early hardening product, that came to be preferred by many engineers and architects. It was soon discovered that these imported cements owed part of their alleged virtues to fine grinding, and competition soon led to a race to make finer and finer ground American cements.

The problem was met not so much by installation of new grinding mills as by application of fundamental principles of grinding efficiency, long known and applied in mining and metallurgy, but neglected by the cement industry. One of these was the introduction of closed-circuit grinding and a greater use of preliminary grinders. The introduction of closed-circuit grinding (referring here to

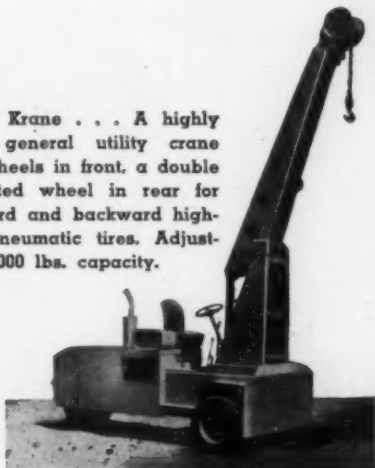
(Continued on page 102)

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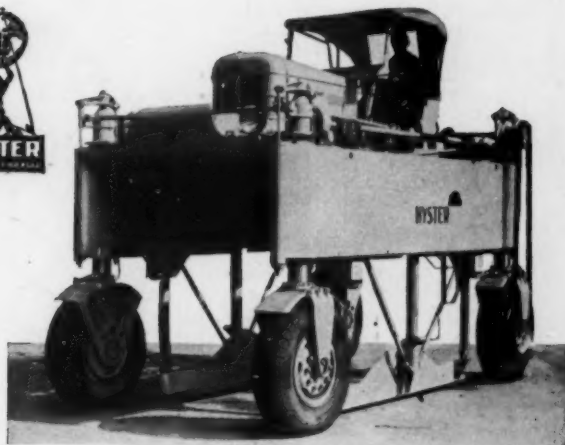
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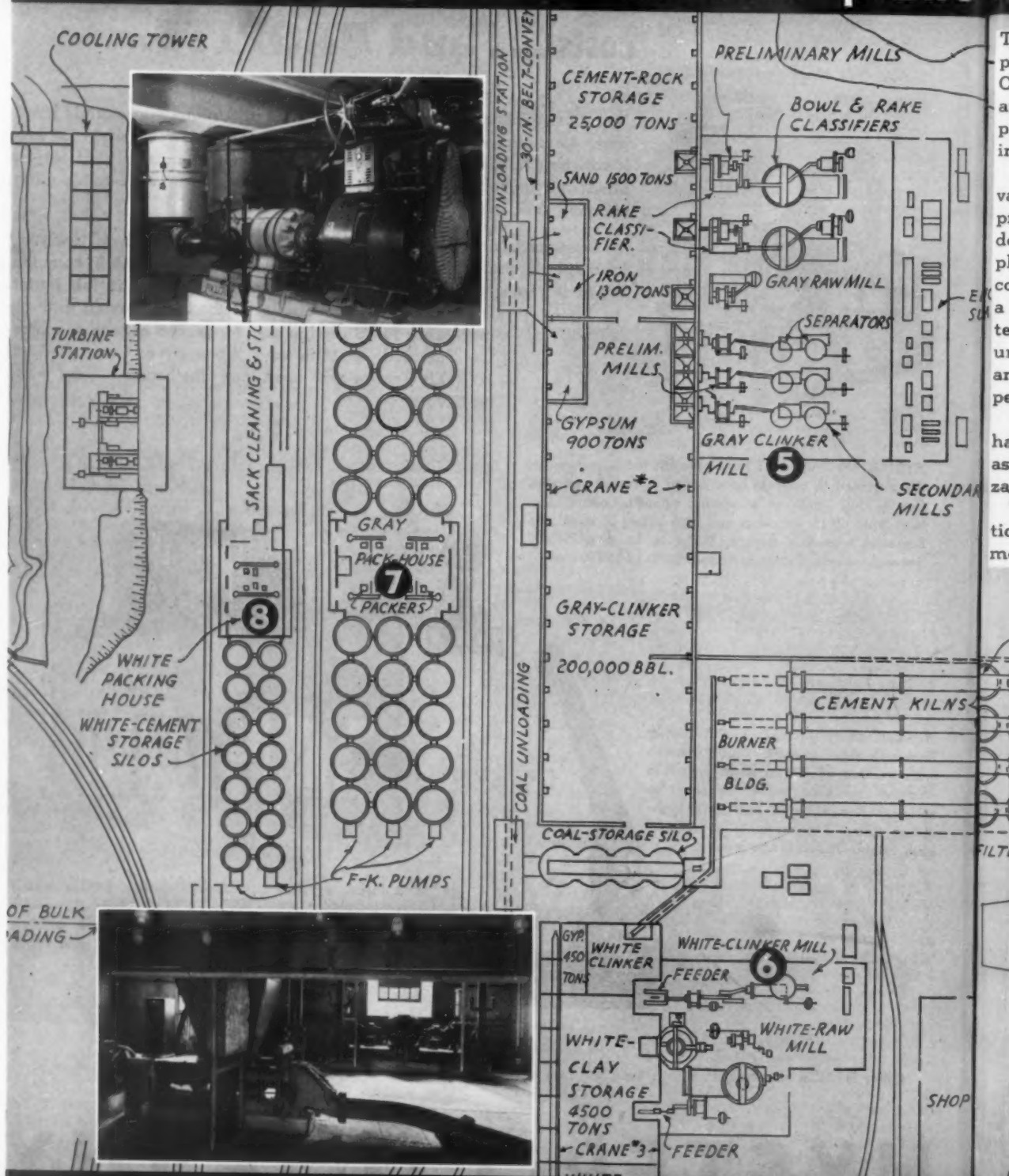
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# 14 Fullers "spotted" in this plant



FULLER-KINYON, FULLER-FLUXO, THE AIRVEYOR CONVEYING SYSTEMS . . . ROTARY FEEDERS AND DISCHARGE GATES . . . ROTARY AIR COMPRESSORS AND VACUUM PUMPS . . . AIR-QUENCHING INCLINED-GRATE COOLERS . . . DRY PULVERIZED-MATERIAL COOLERS . . . MATERIAL-LEVEL INDICATORS . . . SLURRY VALVES . . . SAMPLER FULLER AERATION BLOCKS



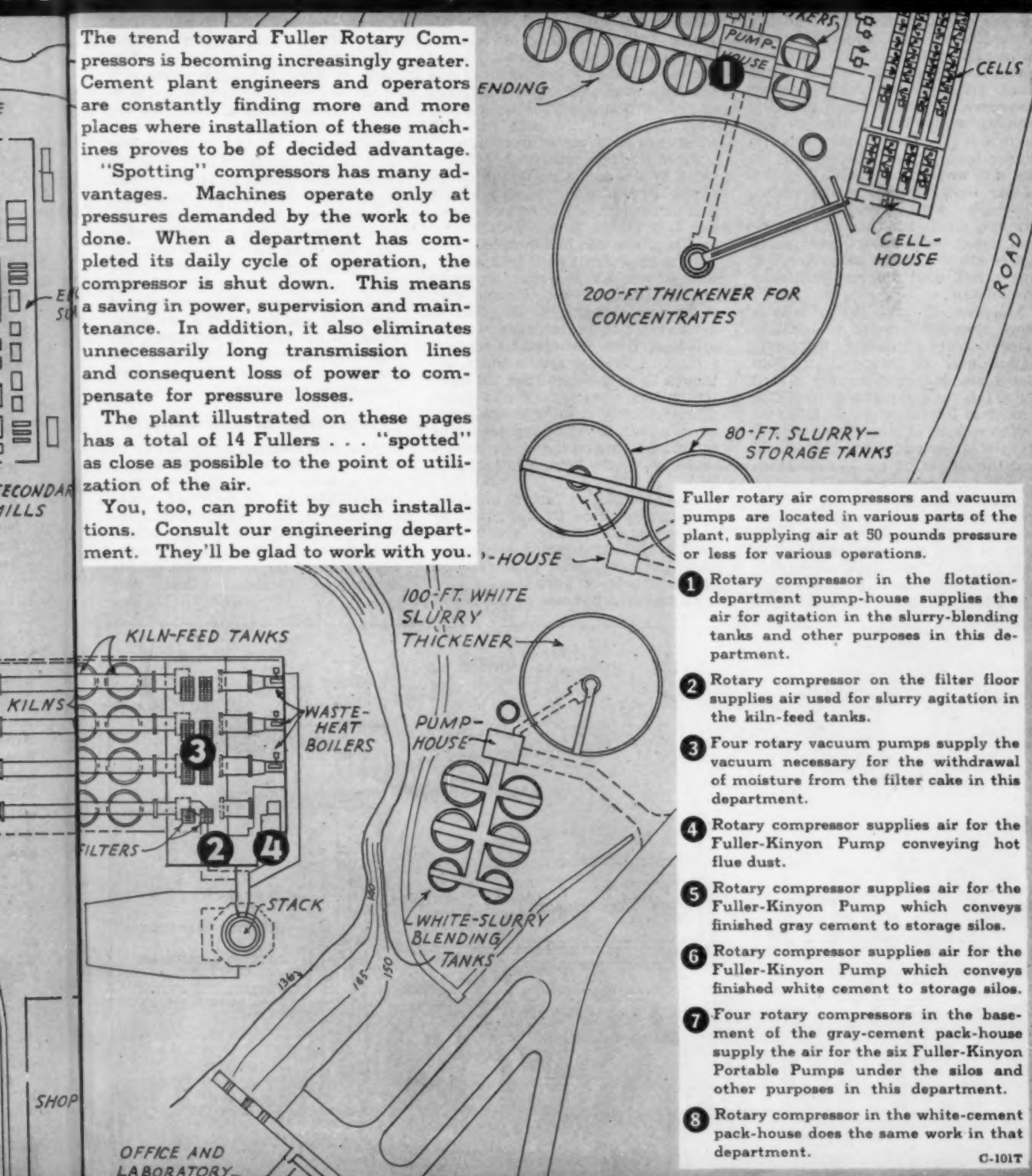
# nt for . . . Air where and when it's needed

The trend toward Fuller Rotary Compressors is becoming increasingly greater. Cement plant engineers and operators are constantly finding more and more places where installation of these machines proves to be of decided advantage.

"Spotting" compressors has many advantages. Machines operate only at pressures demanded by the work to be done. When a department has completed its daily cycle of operation, the compressor is shut down. This means a saving in power, supervision and maintenance. In addition, it also eliminates unnecessarily long transmission lines and consequent loss of power to compensate for pressure losses.

The plant illustrated on these pages has a total of 14 Fullers . . . "spotted" as close as possible to the point of utilization of the air.

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Fuller rotary air compressors and vacuum pumps are located in various parts of the plant, supplying air at 50 pounds pressure or less for various operations.

- 1 Rotary compressor in the flotation-department pump-house supplies the air for agitation in the slurry-blending tanks and other purposes in this department.
- 2 Rotary compressor on the filter floor supplies air used for slurry agitation in the kiln-feed tanks.
- 3 Four rotary vacuum pumps supply the vacuum necessary for the withdrawal of moisture from the filter cake in this department.
- 4 Rotary compressor supplies air for the Fuller-Kinyon Pump conveying hot flue dust.
- 5 Rotary compressor supplies air for the Fuller-Kinyon Pump which conveys finished gray cement to storage silos.
- 6 Rotary compressor supplies air for the Fuller-Kinyon Pump which conveys finished white cement to storage silos.
- 7 Four rotary compressors in the basement of the gray-cement pack-house supply the air for the six Fuller-Kinyon Portable Pumps under the silos and other purposes in this department.
- 8 Rotary compressor in the white-cement pack-house does the same work in that department.

G-101T

## FULLER COMPANY-CATASAUQUA, PA.

CHICAGO, 3  
Marquette Bldg.

WASHINGTON, 5, D. C.  
Colorado Bldg.

SAN FRANCISCO, 4  
Chancery Bldg.

(Continued from page 98)

clinker grinding) halted a tendency toward larger and larger compartment mills, which some of the newer plants had begun to install. When finer grinding of clinker became necessary, it was evident that the previous advantages of large 3- and even 4-compartment mills were no longer apparent, for the capacity of the mill was limited to the capacity of its least efficient compartment. Obviously, with different sizes of grinding media and the same peripheral speed, all compartments could not be efficient at the same time, nor was a mill with different diameters the solution.

Moreover, it was shown that a more efficient type of preliminary grinder—large diameter ball mill, hammermill or ring-roll mill—in closed circuit, could prepare a feed for a tube or compartment mill fine enough to increase the tube mill output 25 percent or more. Thus two- or three-stage grinding was introduced and the output of old 7- x 22-ft. to 7- x 26-ft. compartment mills was so increased that plants with mills of these sizes were able to continue their use with efficiency, and in fact many mills of this size were installed in new plants. Where stage, closed-circuit grinding was fully understood, and advantage taken of it, the mills

were able to meet the new fineness requirements without appreciable increase in the number of tube or compartment mills. In some instances the mill partitions were removed and the mills used as straight tube mills. In other instances middle screens were put in and the mills fed from both ends to a center discharge.

Finer grinding was further facilitated by the use of air separators in closed circuit with the finish mill, and by use of newly developed grinding aids in the form of dispersion agents. Those who had installed oversized compartment mills took advantage of the air separator to make closed-circuits of one, two and even three compartments in an effort to get some of the advantages of stage grinding. These installations are presumably operating satisfactorily, although today the advantages of separate primary, secondary and finish grinding units, even with the additional power, elevating and conveying equipment, are believed to exceed those of single large compartment mills.

There were other factors involving the changes made in the character of the cement clinker, which very greatly affected grinding economies, as will be noted later in the section of this article on kilns.

An unsolved problem in the use of

closed-circuit clinker grinding is how far air separation can be relied upon to produce a satisfactory cement. When applied to the final grinding unit, at least with some clinkers, it tends to yield a product deficient in the very small micron sizes (the so-called cement flour). Most recent practice is to do the final grinding in a two-compartment mill, with the first compartment in closed circuit with an air separator, but the second compartment operated in open circuit. However, each individual problem has to be solved by a study of the completely air-separated product, which with some clinkers may be entirely satisfactory. It is possible of course to manipulate the air separator to get more or less fines, but the fundamental problem of the quality of completely air-separated cements is a live one.

### Preparation of Raw Material

American manufacturers, driven by domestic competition, as well as foreign, to finer grinding of cement, soon discovered that the secret of quick-hardening or high-early-strength, involved a slightly higher lime content than the cements they had been making—more of the tri-calcium silicate in place of di-calcium silicate. And

(Continued on page 106)

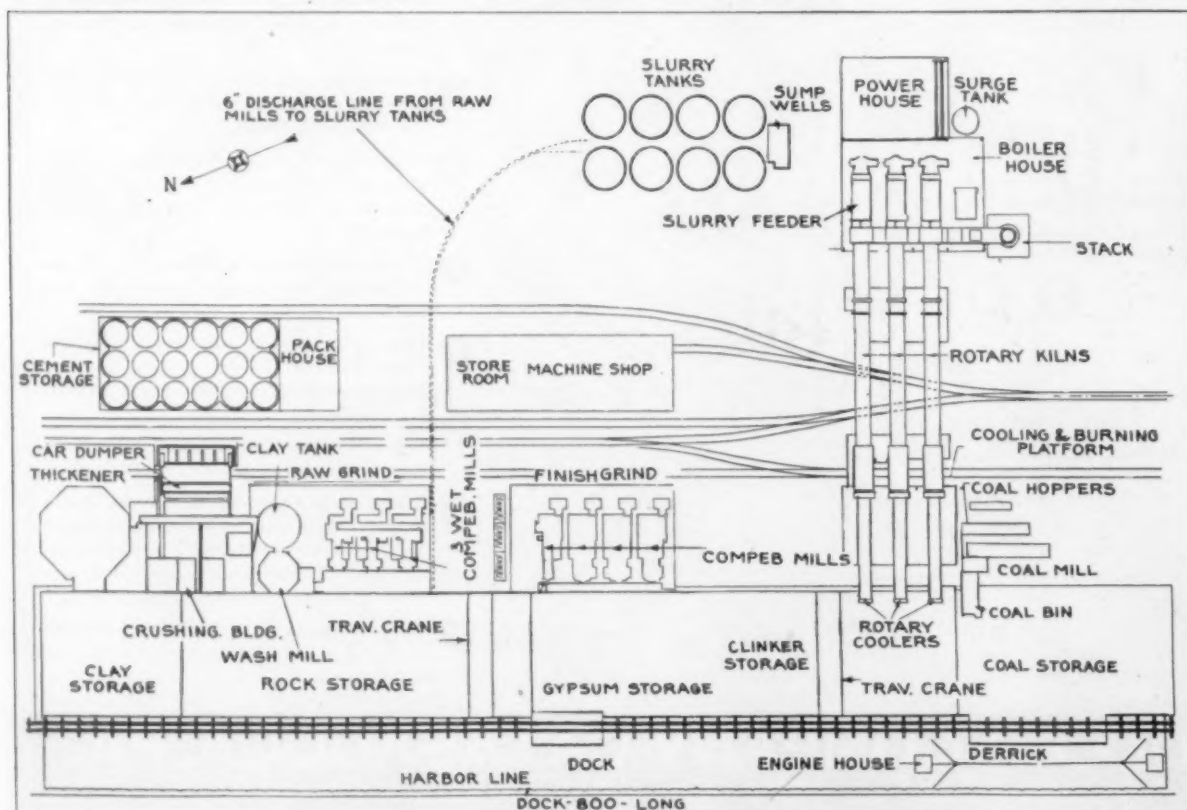


Fig. 5: Plan and machinery layout of the Florida Portland Cement Co. at Tampa, Florida

*Nitro Starch Base*

# High Explosive Efficiency

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*Plus*

THREE ADVANTAGES  
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Trojan Products will be chosen by many for the construction  
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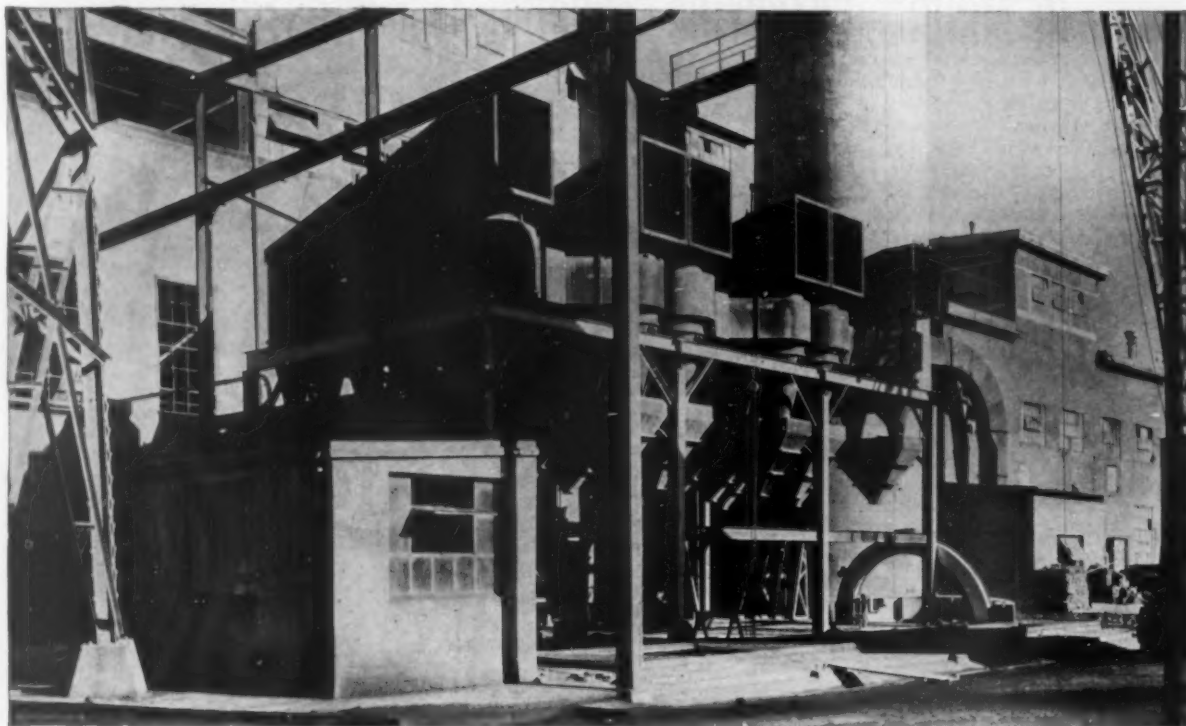
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ROCK PRODUCTS, August, 1944



# ..."no wear, nothing

*Says Dewey Portland Cement Company*



## YOUR POSTWAR DUST COLLECTION PROBLEM

• THE EXPERIENCE of the Dewey Portland Cement Company so appropriately put in their open letter on the opposite page has been the invariable experience of the rock products industry with Buell (van Tongeren) Dust Recovery Systems, wherever used.

Today, however, most plants are handicapped by the lack of dust collection and other badly needed equipment of all kinds due to the absence of priorities.

With a full understanding of this condition and the hard-

ships it presents, Buell suggests that plants in the rock products industry submit their dust collection problems to Buell's engineering staff now, while there is ample time for careful planning. And thereby assure to these plants the early installation of dust collection equipment when materials are again released for civilian construction work.

*Rock products operating men and engineers are invited to write for a copy of the factual illustrated book—"The Buell (van Tongeren) System of Industrial Dust Recovery."*



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# spent for maintenance"

...about Buell (van Tongeren) Dust Collectors

MANUFACTURERS OF  PORTLAND • MASONS • 24-HOUR CEMENTS

**DEWEY** PORTLAND CEMENT COMPANY  
PLANT OFFICE BOX 749 - PHONE 2-4451  
Davenport, Iowa

May 27, 1944.

Buell Engineering Co, Inc.  
70. Pine Street,  
New York(5)  
New York.,

Gentlemen:

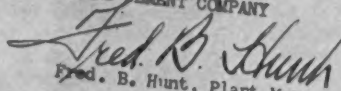
We are very glad to advise you that after two years of very efficient operation of your dust collectors we have just completed a minute internal inspection of this equipment.

This inspection showed that there was no internal wear.

We are also glad to advise you that during these two years of operation we have spent no money whatever on these collectors for maintenance or repairs.

Yours very truly,

DEWEY PORTLAND CEMENT COMPANY

  
Fred. B. Hunt, Plant Mgr.

FBH-D



(Continued from page 102)

this couldn't be had merely by more burning or sintering. It also involved finer grinding and more complete blending of the raw materials, as well as much more accuracy in methods of proportioning and feeding. In fact, the introduction of high-early-strength cement manufacture in this country, has done more than anything else to make the cement industry a scientific one and has given chemists a very important place on the plant staff—more important than some company executives are willing to concede.

The introduction of the autoclave test about 1938 and the controversy over the effect of magnesia, and the specifications a short time later for five types of cement, including for the first time chemical analyses, still further concentrated attention on the character and preparation of the raw mix; that is, on the chemistry of cement manufacture.

At the start, these problems were more easily solved by the wet process than in the dry. Finer grinding and better blending were accomplished by introduction of hydraulic closed-circuit grinding methods, the use of large slurry thickeners, made necessary by much thinner slurries, and better devices for stirring or agitating the slurries up to the point where they are fed to the kilns. Probably the present acme of achievement in this respect is at the Northampton plant of the Universal Atlas Cement Co. where in addition to the usual compressed air and rotating mixing-blade agitation, the slurry is continuously drawn from the bottom and pumped to the top of the kiln storage tanks—thus keeping it in constant circulation.

One of the fairly recent discoveries in cement manufacture is that raw materials either dry or in slurry tend to segregate, both in grinding and subsequent handling, and this accounts in some measure for the vagaries of cement made from the same raw materials in the same kiln. Probably at many plants more attention will have to be paid to this detail, not only to make good cement, but to make a product decently uniform from day to day. Developments in dry blending have made it possible to accomplish this better blending in the dry process also.

All the economies of closed circuit grinding attained in the finish mills were likewise attained in the raw mills, and this removed the necessity for installing a great deal of new grinding machinery, except preliminary mills. The preliminary mills and the first compartments of raw grinding wet mills are now quite generally closed-circuited with vibrating screens of 20-mesh, or with hydraulic classifiers of the rake and bowl types.

The most up-to-date wet mills have adopted the latest metallurgical methods with thickeners to produce the final slurry. The result of this additional handling and the use of these numerous agitating devices and the greater dilution of the slurry undoubtedly make for better blending of raw materials, as well as to increase the efficiency of the raw grinding operation.

### Kiln Practice

One would have a difficult time, from studying the record of the last 20 years, to find out what size kiln is the most popular, and hence, on the evidence, the most efficient. This is to be expected because there are the elements of two separate schools of thought on the design of rotary cement kilns. There are those who view a kiln purely as a furnace and are concerned wholly with problems of efficient combustion, length, velocity and luminosity of the flame, capacity of the furnace to provide the maximum transferable heat to the greatest possible load of clinker, etc. Second, there are those, relatively few in number at present, who believe the most important function of a rotary cement kiln is as a chemical-forming device, in which the efficient application of heat is important but not the sole criterion.

Since very little is known about the actual process involved in chemical combinations which take place between minerals in the solid state, the real chemical function of a rotary kiln is not known, and is frequently ignored altogether by kiln designers. It has been proved by mathematics, on data very generally accepted, that the heat leaving the clinkering zone of a rotary kiln is much more than necessary to calcine the limestone in the calcining zone and to dry the materials in the zone above the calcining zone. Hence, there being no useful way to employ this excess heat in the kiln, it is of no consequence whether the kiln be 150 or 450 ft. long, provided it is properly dimensioned for its job as a furnace for supplying the desired amount of the right kind of heat.

In any event there are kilns in operation today, in competitive plants, from 110 ft. length to nearly 500 ft. However, a study of plant changes during the past 20 years shows clearly that 110 ft. is too short for a wet-process kiln, with or without waste-heat boilers. During the 20's wet process kilns 10 or 11 ft. in diameter were installed in various lengths from 150 to 175 ft. where waste-heat boilers were used and in lengths up to 343 ft. without waste-heat boilers. It was soon found that 175-ft. wet-process kilns did not make efficient furnaces for waste-heat boilers, largely because of the enormous heat

loss in the water vapor or steam in the kiln gases. Water vapor does not give up its latent heat except on condensation, and this never occurs in boiler flues. Consequently, in nearly every instance kilns of approximately this size had to be equipped with filters to reduce the water content of the slurry. This, also, naturally increased the thermal efficiency of the kiln as a clinker-making device. The longest wet process kilns with filters and waste-heat boilers are 250 ft. (Northampton plant). This length was possible only by use of a special device (concrete pumps) to feed the slurry cake to the kilns through practically air-tight connections.

Incidentally, filters have also been installed on wet process kilns, with and without waste-heat boilers, for other reasons than thermal efficiency. In the case of plants using slag in the wet process, slurry filters are a necessity. Slag slurries of ordinary wet-process water content have a tendency to set like concrete in mixing tanks, pipes and other equipment. The most effective preventive is dilution of the slurry with additional water. Filters are required to remove this excess water ahead of the kilns. In other plants the nature of the slurry—its stickiness, for example—may require excessive amounts of water, which it is uneconomical to evaporate in the kiln. In one or two instances where flue dust has been added to the slurry, it has given the slurry a tendency to set, so that more water was required to handle it. In one instance in filtering this excess water from a slurry to which flue dust had been added, the filters rendered an extra service by taking out practically all the alkali content of the flue dust, in solution with the water extracted.

### Partly Smelted Clinker

The clinker made in rotary kilns today is a different product from that made 20 years ago. It is assumed to be a better product. The clinker is no longer brought to the point of "incipient fusion," a good part of it is actually fused. It is assumed that there is more chemical activity between minerals in a state of fusion than in the solid state, so when it became necessary to increase the lime proportion of portland cement clinkers to obtain early strengths, the tendency to actually fuse the mineral components increased. This accounts for changes in kiln firing methods and other kiln practices quite as much as desire for increased thermal efficiency.

For example, unit coal pulverizers attached directly to the kiln, drying the coal with waste heat from the clinker, while entirely justified because of elimination of a separate coal grinding plant, also met the

(Continued on page 108)



# DOSE OF SALT



Encrusted with chemical salts, this Tri-Clad motor continues to drive a pump without breakdown of its insulation. In almost every industrial plant, motors are called upon to keep going under conditions which try their endurance to the limit. It may be in a plating room, or on an exhaust fan, or in a wet sub-cellar, or — as in this case — in connection with chemical processing. In emergencies, open motors may face conditions for which good engineering practice would require totally enclosed construction — conditions which tend to corrode the frame and attack the insulation. Endurance of Tri-Clad motors under such conditions results from tests like the one described below.

## Salt-spray test of **TRI/CLAD** motors gives assurance of long life in severe service

In this accelerated life test to determine the ultimate endurance of their insulation, the motors are operated to failure under one of the worst possible combinations of conditions. They are continually exposed to a 2% salt-water spray, while operating on a duty cycle of 3 minutes on and 37 minutes off. (These repeated voltage surges impose greater stress on the insulation than would continuous operation.) Tests are run on all new insulations developed, and as a production check on motors taken at random off the assembly lines. Because of their endurance under this severe test, among others, Formex\* wire and Glyptal\* bonding material were chosen for Tri-Clad insulation.

\*Reg. U.S. Pat. Off.



Left: Conical hoods cover the tanks in which these salt-spray tests are conducted.

**GENERAL  ELECTRIC**

Every week 192,000 G-E employees purchase more than a million dollars' worth of War Bonds.





A clean, up-to-date clinker grinding mill at Lehigh Portland Cement Co., Allentown, N. Y.

(Continued from page 106)

concurrently developing demand for a short intense flame, which would help melt some of the clinker. This kind of a flame became possible with the unit coal pulverizer because it permitted a much better mixture of primary combustion air with the fuel, and because it utilized for increasing the flame temperature some of the waste-heat from the kiln or clinker. Probably more waste heat and more fuel would be used today for this purpose if refractories could be found which would stand the gaff.

Just as unit coal pulverizers fitted into the method of making a new kind of clinker, so did the air-quenching type of clinker cooler fit into this picture. At first applied to kilns largely as a waste-heat recuperator, it was found that it resulted in a more brittle, or friable, clinker, which was easier to grind. Slow cooling of clinker, like slow cooling of metals, tends to make a tough, resistant material. So, as noted in the section of this article on grinding, some of the increased capacity of grinding machinery is due to changing the character of the clinker itself, as well as to application of increased knowledge of the principles of grinding.

When the industry became agitated over the expansion of neat cement bars in the new autoclave test, it was discovered that air-quenching or quick cooling of clinker had the additional advantage of fixing the magnesia and certain alumina compounds in glasses, which did not hydrate readily, and hence helped many a cement to pass the autoclave test. This glass element, however, is not an inert ingredient of the cement; apparently it does hydrate in the

course of time, with the evolution of heat.

Before we leave the subject of kiln practice, a word in defense of very long kilns. They are probably entirely justified as instruments of chemical combination, as well as by large capacities when large diameters can also be used. It is known that chemical reaction between solid particles or crystals takes place only when they are in very intimate contact; also, that such chemical reaction begins and is most active at temperatures which cause a breakdown and rearrangement of the molecules and atoms in the crystal lattice structures of the particles. Now limestone, or calcium carbonate, silica and alumina (clay) all undergo changes in their crystal structure at temperatures much less than those of the clinkering zone of a cement kiln; indeed certain forms of silica undergo three changes in crystal pattern before reaching sintering temperatures.

Therefore, it seems entirely logical to believe that the longer the kiln, the more intimate will be the mixture of calcium-carbonate, alumina, iron oxide and silica grains or crystals, since no better way of making an intimate mixture is known than tumbling the materials together in a drum. Second, that the arbitrary distinctions between clinkering zone, calcining zone and drying zone are not justifiable. Chemical reaction between the mineral particles may begin far back in the kiln, and the calcining and clinkering zones give only the finishing touches. It is true that samples have been taken along the length of a rotary kiln and the points where calcination of the limestone and the clinkering of the materials begin are fairly easily established. But, is it safe to assume that the

upper reaches of the kiln have played no part in conditioning the assorted minerals for subsequent combination, or even started the work of interlacing the crystals of one with another? The cement made in very long kilns is almost invariably good cement.

### Conclusions

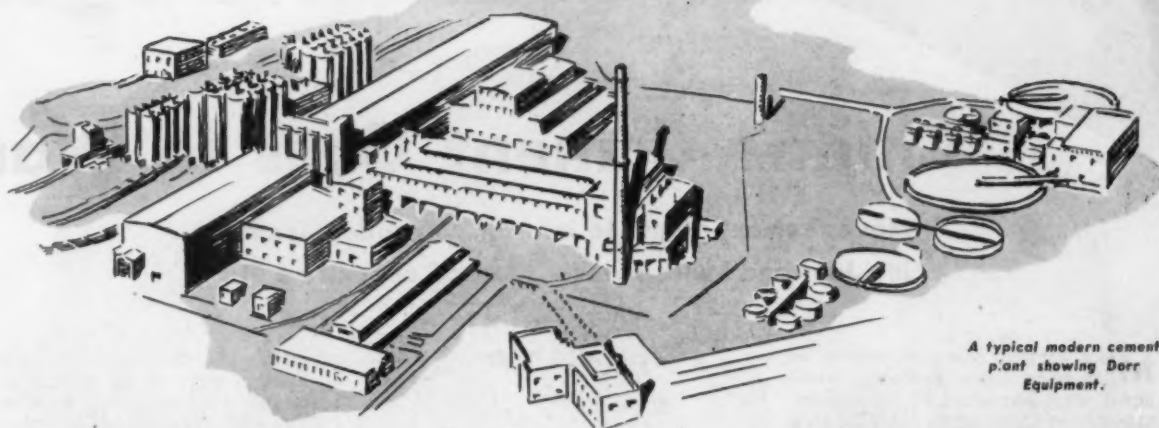
The product called portland cement today is a very different product from the portland cement of 20 years ago, but it is a product that old plants with modern machinery and processing can make almost as readily as most of the newer plants. Whether it is really a better product, in that it makes better concrete, is, we believe, still honestly a matter of some doubt. It is still a matter of debate whether or not other desirable qualities in portland cement have been sacrificed to get one that would have largely the virtue of high early strength.

Our own guess would be that concrete as a structural material has suffered more from changes in the technique of mixing and placing than from faults of the portland cement as originally made. Excellent and long enduring concrete was made with old-time cements and even haphazard aggregates in the days when dry mixes and long *ramming* into place were the style. With the advent of sloppy mixes that could be "poured" into place, troubles with concrete came thick and fast.

That air-entraining (a better word would be air-entrapping) cements may be the answer to all the present woes of the cement and concrete maker, is not a proper subject for discussion here, and this article has already exceeded a desirable length. Anyhow, there is a discussion of this subject elsewhere in this issue in the report on the A.S.T.M. annual meeting. It is not a subject of as great interest to cement manufacturers as to cement users. Any cement manufacturer can readily add the air-entraining agent at his grinding mills. Aside from the slight extra cost of the agent itself, it may add to the cost of cement, if it means finer grinding. Some manufacturers are attempting to provide a finer ground and hence a stronger cement to make up for the loss in strength in mortar and concrete caused by the air entrainment.

There are manufacturers who expect the post-war market demands to be so great that for a few years at least there will be a sellers' market, and hence purchasers will be compelled to accept three to five standard types of cement; and that competition in fineness of product has reached and receded from its highest point. With the certainty of higher fuel and power costs, and possibly higher labor costs, manufacturers rightly believe they should not be put

(Continued on page 135)



A typical modern cement plant showing Dorr Equipment.

# DORR EQUIPMENT FOR MODERN CEMENT PRODUCTION

For the new cement plant starting from scratch or for converting an open circuit mill to closed circuit grinding, Dorr equipment has produced outstanding results in wet process cement manufacture.

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The results obtained by Calaveras at San Andreas, Calif., shown in the box at the right, demonstrate the improvements that can be obtained by conversion to partial Dorr C.C.G. Existing plants with raw compartment mills or individual ball mills can be changed over to partial Dorr C.C.G. without interruption of operation.

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Raw Grinding—61%  
Rotary Kilns—13%
- Power Decrease  
Raw Grinding—36%
- Finer Raw Grinding  
94%—200 m; formerly 88%  
0.5%+100 m; " 3-4%
- Better Cement  
Better quality due to elimination of stray oversize and finer grinding. More uniform slurry as to particle size, moisture and composition.



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# China's Cement Goes to War

Moves cement plants to interior to evade advancing Japs and builds number of small capacity units

By WANG TAO\*

**M**ANY cement plant executives in America have probably wondered what happened to the cement industry in China since the Japanese invasion. A brief review of the industry in China and the efforts which have been put forth to salvage the plants and equipment for installation in Free China should therefore be of interest.

In 1904, the first Chinese cement works was founded in Tongshan, Hopei, under the management of Chee Hsin Cement Company, with an annual capacity of 200,000 bbls. of cement. Later Ta Yei Cement Works also was started. These two plants monopolized the market for almost 12 years.

After World War I, the Tongshan plant was expanded, and also two new companies were founded; namely, The Shanghai Portland Cement Co., Ltd., and The China Portland Cement Co., Ltd. Total annual production of portland cement reached two million barrels in 1924. However, greater development of the industry was prevented by political instability and general economic depression.

With the formation of the National Government in Nanking in 1927, a new era was opened in Chinese his-

Managing director, Hwa Hsin Cement Co., Ltd.

tory. National unity and political stability made the national reconstruction plans practicable. Demand for cement increased rapidly and the Chinese cement manufacturers enjoyed prosperous business until 1937 when the war broke out between China and Japan. During 1936, the year before the war, total sales of cement amounted to 4,500,000 bbls., about 60 percent of the potential capacity of the industry. Total potential capacity amounted to a little over 7,000,000 bbls. a year. Table I gives a picture of the Chinese cement industry in July, 1937.

## Move Plants to Interior

With the outbreak of the war with Japan, the Chinese cement industry faced a difficult problem of supplying cement for military and other purposes in Free China. During the first two years of war against Japanese aggression, nearly 94 percent of cement production was lost since all the big cement works were located in the coastal provinces under Japanese occupation and only one cement works remained intact.

As cement plant machinery is comparatively heavy, it was almost an

impossible job with limited transport facilities to move to the interior any of the cement works when mass migration of other industrial plants was taking place simultaneously with the withdrawal of the Chinese army from the coastal line to the interior provinces.

Nevertheless, necessity compels one to try the impossible. The writer feels honored in having participated in the job of dismantling, packing and carrying away in 35 days an entire cement plant with its 3000 tons of machinery and materials. The plant was put into operation in another location 12 months later.

Demand for cement in the interior continues to increase, but it is not practicable to build new cement works with machinery imported from abroad. The solution to the question of supplying cement lies in putting up small plants with locally-made machinery. In 1938, the writer designed the first plant of its kind in a far west Chinese province. The plant was a success and now there are quite a number of similar plants scattered all over Free China.

## Semi-Automatic Shaft Kiln

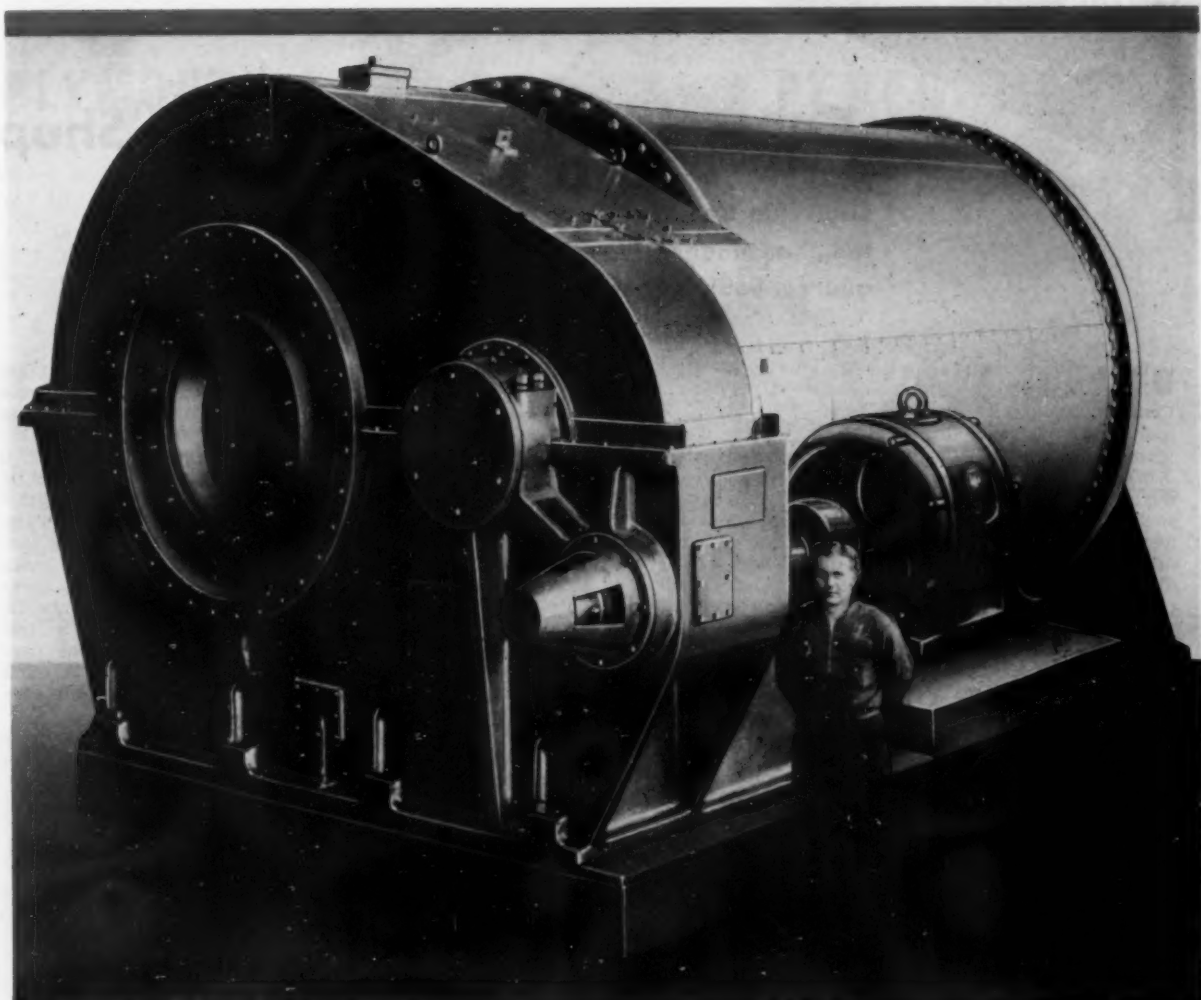
The capacity of this small plant was 100 bbls. a day which was later expanded to 200 bbls. per day. An

(Continued on page 135)

TABLE I—PRE-WAR CHINESE CEMENT INDUSTRY

Name of Company	Location	Annual Output in Barrels	Capital (N. C. \$)	Type of Machinery
Chee Hsin Cement Co., Ltd.	Tongshan	1,700,000	14,000,000	7 rotary kilns, dry method, main machinery from F. L. Smidth & Co. with own power plant 18000 k.v.a.
	Ta Yei	360,000	.....	2 rotary kilns, dry method, machinery from Polysius.
Kiangnan Cement Co., Ltd.	Chi Shia Shan (Nanking)	1,300,000	8,000,000	2 rotary kilns, semi-wet method machinery from F. L. Smidth & Co. (not yet completed).
China Portland Cement Co., Ltd.	Lungtan	1,300,000	4,500,000	4 rotary kilns, semi-wet method, 2 sets from Humboldt, 1 set from Polysius, 1 set from Miag.
Shanghai Portland Cement Co., Ltd.	Shanghai	600,000	3,000,000	2 rotary kilns from Polysius, semi-wet method.
Hai-Taun Cement Works	Canton	1,080,000	8,000,000	3 rotary kilns, semi-wet method, from Polysius.
Ta Yuan Cement Works	Ta Yuan	270,000	.....	2 rotary kilns from Japan.
Szechuen Cement Co., Ltd.	Chungking	270,000	2,000,000	2 rotary kilns, wet method, F. L. Smidth & Co.
Tai-ching Cement Co., Ltd.	Tsinangfu	180,000	.....	1 shaft kiln from Krupp (not completed).
		7,060,000 barrels		

N. B.—Cement works in three eastern provinces are not included in this table. Green Island Portland Cement Co. in Hongkong, with "Metro-Vicks" rotary kilns of 1,200 barrels per day is owned by the British, and it chiefly supplied the local market of Hongkong.



The above is a Kennedy Integral Double Reduction Herringbone Gear Driven Tube Mill which enables the motor to be direct connected to the high speed shaft. The shafts of these gears are carried in roller bearings, the seats of which are bored in a jig that have less than .003" differential in bearing centers. These gears cannot be misaligned or set wrong. This greatly reduces the power required to drive a mill and the mill can be used as a rod mill, a tube mill for wet or dry grinding, or for air sweeping. These mills are made in any length or diameter desired.

#### THE LATEST THING IN GRINDING EQUIPMENT

*Write for Descriptive Literature*

We have a very large line of mining, crushing, cement, lime-burning and pulverizing equipment, and pulverized coal equipment. If interested write for special bulletins.

**KENNEDY-VAN SAUN MFG. & ENG. CORPORATION**  
*Representatives in All Principal Cities of the United States*  
**2 PARK AVENUE**  
**NEW YORK, N.Y.**  
**FACTORY**  
**DANVILLE, PA.**

## Centralize Repairs in One Shop

Louisville Cement Co., plant at Speed, Ind., has modern shop for all repairs to quarry, haulage, and milling equipment

**B**EFORE the present shop building was constructed, the Louisville Cement Co. plant at Speed, Ind., had various repair facilities scattered throughout the different buildings. Working conditions were not conducive to the best workmanship as tools and stores were not always available, lighting in every case was not adequate, and facilities for handling heavy equipment did not meet requirements.

To remedy this situation, the operating and engineering departments designed and built a repair shop where all repairing, maintenance and fabricating operations could be concentrated under one roof. The result is shown in the accompanying illustrations.

Walls are of cinder block and con-

By RALPH S. TORGERSON

crete construction and the interior and roof supporting members are of structural steel. The upper walls around the gable roof have corrugated asbestos sheathings. Wide window areas set in steel sash and a glazed gable roof section with aisles in the center of the building in the form of a T provide ample light.

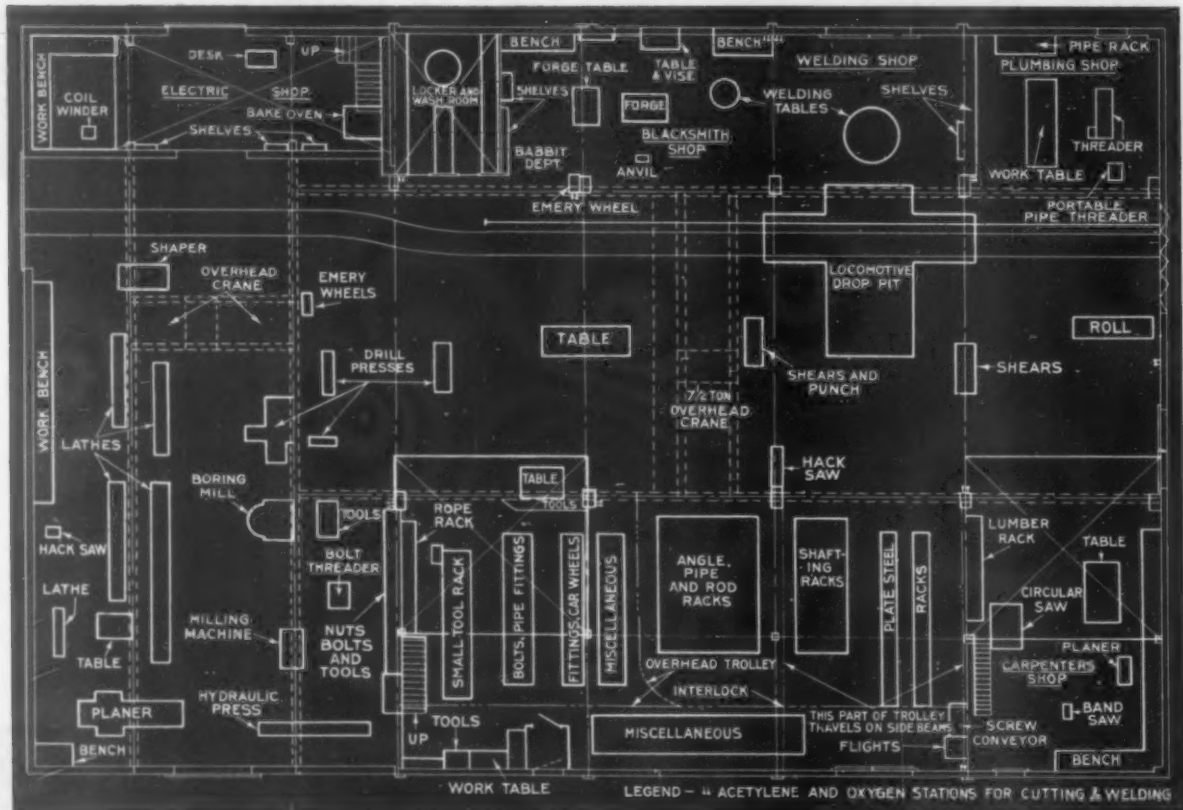
To one side in the main aisle of the shop are narrow and wide gauge tracks to permit rolling stock and locomotives to be run into the building for repairs. The entire floor is of reinforced concrete with a drop pit at one end so that locomotive wheel assemblies may be lowered by

jacks into the pit. Over the pit are removable, reinforced concrete slab covers with grab irons for lifting them out.

In this aisle, above the track, is a 7½-ton P. & H. overhead traveling crane for handling locomotive, car, track and wheel assemblies and any other heavy equipment, such as motors, generators, etc. On the main aisle floor near the door are sheet steel forming tools, including shears, roll and punch machines. On one side of the main aisle is the carpenter shop equipped with a band saw, circular saw, planer and carpenter's table.

Above the carpenter shop is a balcony where lumber and other supplies are kept.

(Continued on page 114)



Plan of modern shop facilities for Louisville Cement Co., Speed, Ind. Layout shows all important machinery



# PLYMOUTH for *Enduring* PERFORMANCE



## At Basic Refractories Plymouth Locomotive Is Establishing a New Definition for Performance!

Put a Plymouth Locomotive on the toughest industrial haulage job—it's the quickest and most satisfactory way to get acquainted with Plymouth's power, speed and dependability in action.

The haulage job at Basic Refractories, Maple Grove, Ohio, ranks with the toughest of them. It's a seven day week job, switching and moving loaded cars that supply limestone for steel mills. When necessary—and that's most of the time—Plymouth can haul a string of 12 to 14 of these cars, each loaded 50,000 to 60,000 pounds per car. Yes, *Plymouth is getting the job done and establishing new performance records while doing it!*

If you want the satisfaction of knowing your industrial haulage problems are being capably met, investigate Plymouth Gasoline and Diesel Locomotives. Talk over your haulage problems with a Plymouth industrial locomotive engineer. *Get a Plymouth and start saving time, fuel and money. Write for complete information—today!*



Plymouth Locomotives are designed and engineered for power, speed, versatility and endurance . . . to satisfactorily complete the toughest industrial haulage assignments day after day, with no days off!

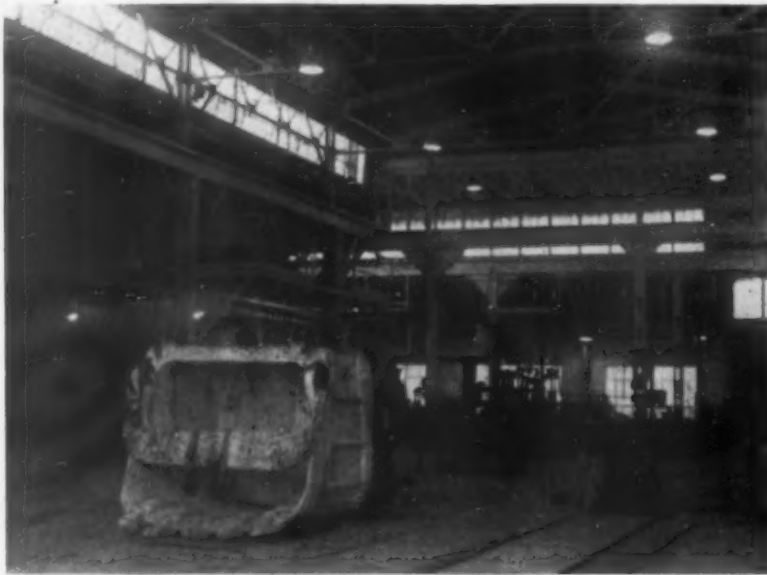


ALSO BUILDERS OF F-R-H CERAMIC MACHINERY AND SILVER KING TRACTORS

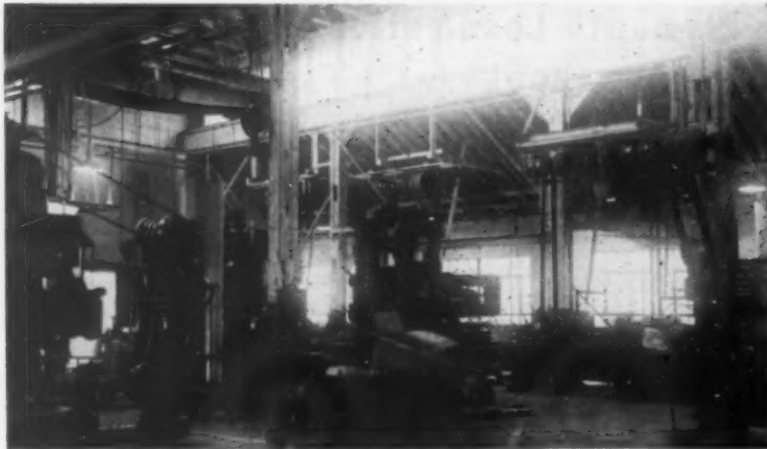
# PLYMOUTH GASOLINE and DIESEL LOCOMOTIVES

## PLYMOUTH LOCOMOTIVE WORKS

Division of The Fate-Root-Heath Co. PLYMOUTH, OHIO, U. S. A.



Main shop aisle with tracks to bring in quarry cars and locomotives for repair; also shovel equipment and other machinery. Machine shop to the rear



Showing overhead traveling crane and some of the machine tools



Blacksmith shop and welding repair section along one side of main aisle. Carpenter shop and storeroom located on the opposite side

(Continued from page 112)

Next to the carpenter shop, enclosed in steel grill guards, is a large storeroom where repair parts, small tools, steel plate, bolts, car wheels and other supplies are kept and released only by proper requisition orders. Over one end of the storeroom is a gallery which is used to store certain items. The store room has an overhead trolley hoist system for moving heavy materials to and from storage.

## Plumbing Shop

On the other side of the main aisle, near the main entrance door, is a plumbing shop where various pipe fittings are kept and equipment is available to work on pipe. Next to this room is the welding department where acetylene and electric welding is done behind a sliding curtain enclosing the entire section where this work is done. Following in line with the welding department is the blacksmith shop equipped with a forge and metal heat-treatment facilities.

A modern wash and locker room is also located on this side of the main aisle. Individual steel lockers are available for each man and there is a modern circular wash fountain with a liquid soap container.

On the same side of the shop, in the extreme corner of the building is an electrical repair room where motors are rewound, coils are baked and other electrical repairs are made. Above the electrical repair shop is another gallery which is used to store repair parts for this department.

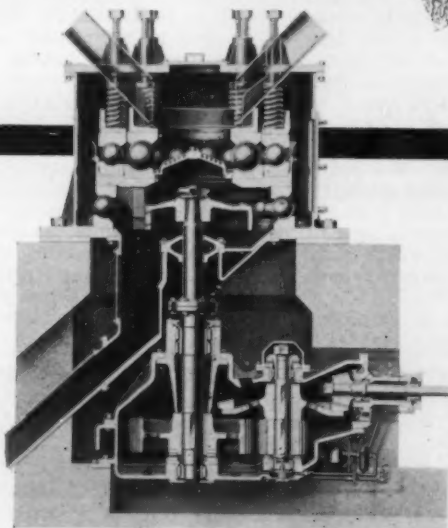
## Gas Welding Pipe Outlets

Although welding work is concentrated as much as possible in the welding room, oxygen and acetylene is also piped directly to nine other valve stations in the blacksmith shop, electric shop, machine shop and main aisle. Pipes are painted in red and blue to differentiate between the gases.

Extending across the end of the building is the completely equipped machine shop. Above the machine shop is another overhead traveling crane operating at right angles to the overhead crane in the main aisle. This crane handles all the heavy steel being machined, equipment to be rebuilt and repaired, and moves the motors into the electrical repair shop through an opening in the wall separating the machine shop from the electrical repair room. Machine tools in the machine shop include: a planer, five lathes, a shaper, hydraulic press, a milling machine, three drill presses, a boring machine, a bolt threader, and emery wheels. Workbenches along the wall have ample light for close work.

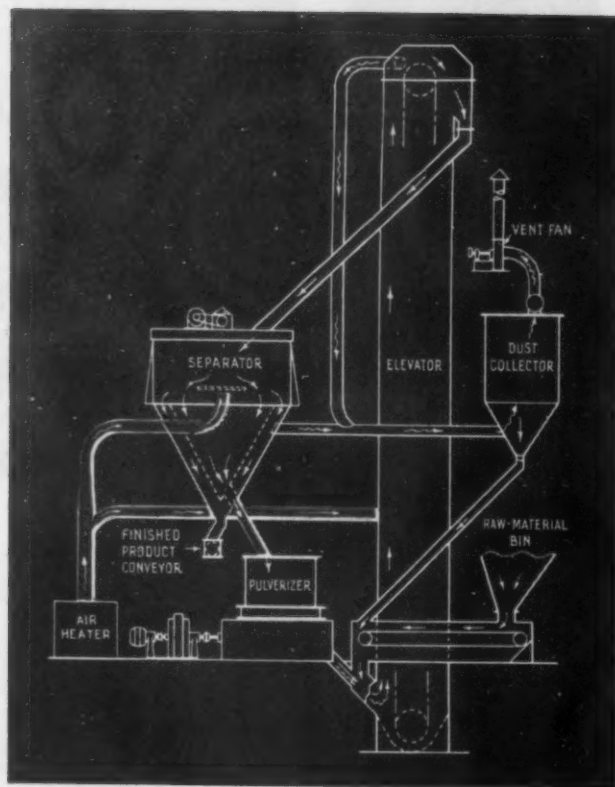
# DRYING AND GRINDING

## in ONE operation...with the B&W Closed-Circuit System



- Eliminates separate drying equipment
- Reduces cost of kiln feed
- Substantial circulating load assures a well-blended product

THE BALL-BEARING PRINCIPLE OF GRINDING MAKES THESE ADVANTAGES POSSIBLE



## THE BABCOCK & WILCOX CO.

85 LIBERTY STREET, NEW YORK 6, N. Y.



**Missouri Portland Cement Co. plans to  
construct cement plant in Memphis, Tenn.  
Ship limestone from Arkansas quarry**

## To Build Cement Plant in Memphis

**M**ISSOURI PORTLAND CEMENT Co. of St. Louis, Mo., has recently purchased a plant site consisting of 30 acres on North Thomas street, Memphis, Tenn., between the properties of the E. L. Bruce Co. and the Chalfant Dock Co. and has completed plans for the construction of a portland cement plant to be built as soon as War Production Board regulations permit. The plant, which will be served by both the Missouri Pacific and Illinois Central railroads, will be ultra modern and will have an annual capacity of 750,000 bbls. Four types of cement will be manufactured: a standard portland, a high-early-strength, a masonry, and a concrete products cement.

As limestone is not available in the immediate vicinity of Memphis, the company's plans provide for the op-

eration of a limestone quarry located on the Missouri Pacific Railroad near Batesville, Ark., to serve the proposed plant.

The Missouri Portland Cement Company now has cement plants in St. Louis and Kansas City, Mo., and the decision to build a plant in Memphis was reached after a thorough survey had been made of the market potentialities in the Mid-South and because of the company's desire to complete a triangle of service throughout the Mississippi Valley.

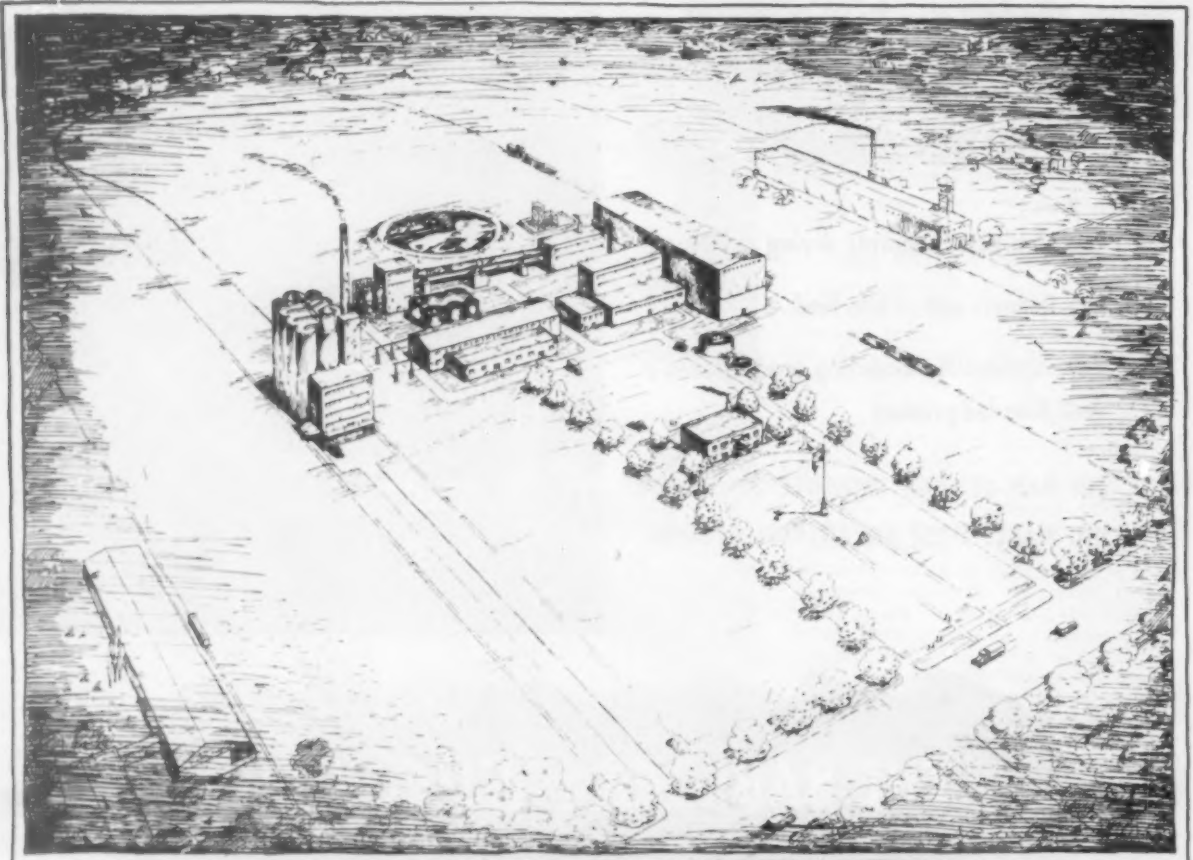
Provided the War Production Board releases the equipment and materials required to build the plant, it is expected to be in operation in time to serve the immediate post-war market, which officials of the company believe will be very active.

The Missouri Portland Cement

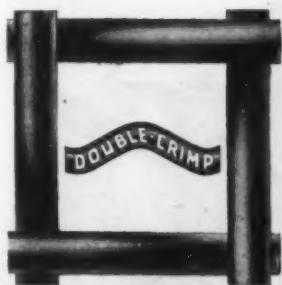
Company has one of the most modern sand and gravel plants in the South located at Memphis and has been active in the sand and gravel business in this area for 40 years.

## National Gypsum Pays for Ideas

EMPLOYEES of National Gypsum Co., Buffalo, N. Y., and the various plants throughout the country are encouraged to submit useful ideas to the company by submitting them to an Ideas Committee headed by Vice-President Dean D. Crandell, in charge of research, and including President M. H. Baker; R. F. Burley, vice-president in charge of sales; J. C. Best, vice-president in charge of industrial sales, and G. H. Tarbell, vice-president in charge of production. The company pays employees \$100 or more for accepted patentable ideas. If a patent is granted and principles involved are used in actual production, an additional \$200 will be awarded.



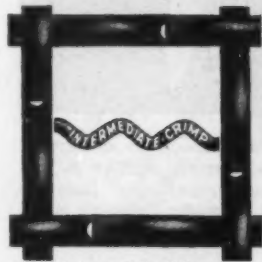
Artist's conception of Missouri Portland Cement Co. plant to be built at Memphis



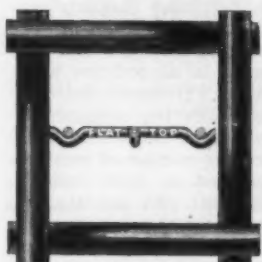
Double-Crimp



Arch-Crimp



Intermediate-Crimp



Flat-Top

#### "Perfect" WEAVES

**ARCH-CRIMP**  
Coiled  
**DOUBLE-CRIMP**  
**DOUBLE-FILL**  
**DUTCH**  
**FLAT-TOP**  
**INTERMEDIATE-CRIMP**

**REK-TANG**  
Selvage-Edge  
**STRAIGHT-WARP**  
Stranded  
**STA-TRU**  
Triple-Warp  
Twisted  
Twisted-Fill  
Twisted-Warp

Arc-Welding  
Bending  
Binding  
Brazing  
**CALENDERING**  
Coiling  
Crimping

Cutting  
Dipping  
Dishing  
Finishing  
Flanging  
Flattening  
Forming  
Framing

**GALVANIZING**  
Jointing  
Knuckling  
Painting  
Rolling  
Selvaging  
Shaping

Shearing  
Slitting  
Soldering  
Spot-Welding  
Squaring  
Stitching  
Tack Welding  
Trimming

Baskets  
Circles  
Coils  
Cones  
Cylinders  
Discs  
Forms  
Leaves  
Lengths

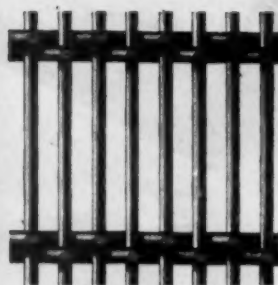
Panels  
Pieces  
Ribbons  
Rings  
Rolls  
Sections  
Segments  
Strips  
Templates

Illustrations show items listed in capital letters. Other wire cloths and screens will be illustrated in subsequent advertisements of this series.

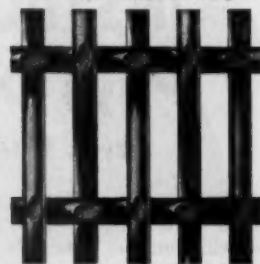
# "The Perfect"

## Wire Cloths and Screens

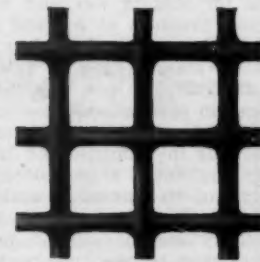
OF  
**SUPER-LOY**  
**STEEL**  
**GALVANIZED STEEL**  
**STAINLESS STEEL**  
**NICKEL-CHROME STEEL**  
**PHOSPHOR BRONZE**  
**BRASS**  
**COPPER**  
**MONEL**  
**NICKEL**  
**ALUMINUM**  
**ANY SPECIAL METAL FOR ANY SERVICE**



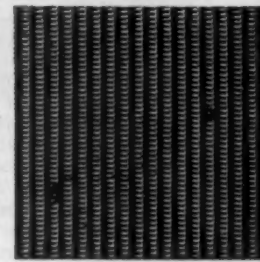
Straight Warp Rek-Tang



Calendered Rek-Tang



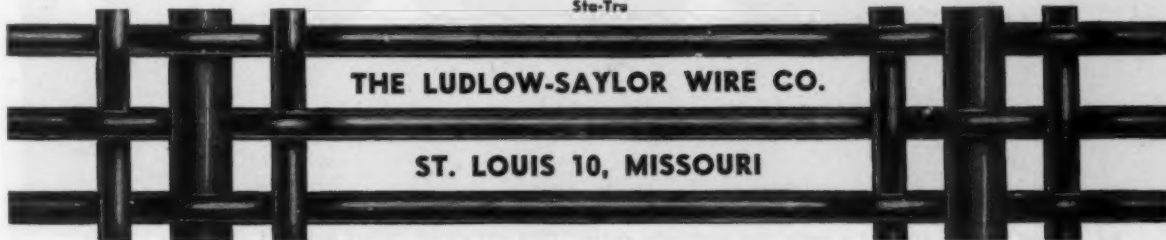
Galvanized



Dutch Weave

#### "Perfect" PRODUCTS

Sta-Tru



**THE LUDLOW-SAYLOR WIRE CO.**

**ST. LOUIS 10, MISSOURI**

## Better Care of INSTRUMENTS Pays Dividends

By J. E. MacCONVILLE\*

**I**NDUSTRIAL measuring instruments and controlling devices have been and will continue to be of prime importance in turning out the materials for waging war and producing better products at a lower cost following hostilities. Therefore, emphasis on maintenance of such equipment reached a new high to prevent losses in production.

The first basic requirement for servicing instruments and the auxiliary equipment is to thoroughly understand its operation and the instructions supplied with it. This elementary step is all too frequently overlooked by the "mechanical genius." Secondly, suitable checking equipment should be available to the plant personnel charged with the responsibility of servicing the equipment. In this connection, The Brown Instrument Co., conducts a training school where customer's instrument men are taught the operation and maintenance of all types of equipment. To supplement this training, where justification of a separate instrument maintenance department is not to be had, factory trained service

\*With Brown Instrument Co.

Fig. 1: Control panel or cubicle for two kilns. Instruments are on interior, protected against dust, but visible through windows



engineers are thus available to the customers. These men are prepared to solve practically any kind of a maintenance problem, and furthermore, their services can be contracted for on a periodic call basis.

### Care of Pyrometers

One of the most widely used and essential industrial instruments applied in the cement and rock products industry is the pyrometer, of either the millivoltmeter or potentiometer types.

Pyrometers of the millivoltmeter type lend themselves admirably to demands of continuous operation, 24 hours a day, week in and week out. Meters of this type have a minimum number of moving parts, hence wear is a negligible factor, and require

only a periodic check to determine if the galvanometer pointer is adjusted to the proper cold junction temperature. Periodic cleaning is essential to guard against the possibility of small particles of dust in the path of the moving coil. Where thermocouple switching contacts are immersed in oil, the liquid should be changed at regular intervals and the contacts cleaned in accordance with the manufacturer's recommendations.

Potentiometers of the mechanical types usually require more attention due to the greater number of moving parts incorporated in such instruments. In general, the mechanical potentiometer pyrometer is a rugged piece of industrial precision equipment, but it should be periodically

(Continued on page 154)

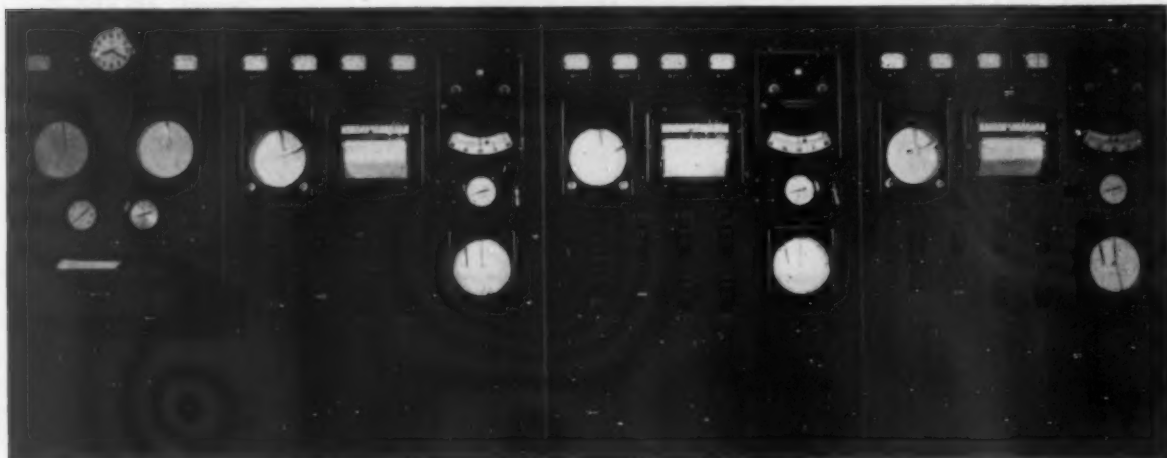


Fig. 2: Panel for three kilns and a central fuel conditioning system. Clock and control stations, desk and drawer are provided



*This*   
**PATENTED FEATURE**  
 Makes it the choice  
 in the cement  
 industry, too, where  
 others have failed



**DIXIE**  
*Non-Clog*  
**HAMMERMILLS**

Because of its patented moving breaker plate the Dixie Non-Clog method of crushing has practically revolutionized reduction of raw materials for hundreds of companies the world over. It is the only crusher with a moving breaker plate. This provides positive mechanical feed while the heavy duty hammers reduce the material until it has reached the desired size and will pass through the screen bars. Even the most plastic, wet, clayey materials will not slow production or clog hammers. This feature alone has saved the cost of 10 men in one plant!

Quality and size of product can be quickly controlled by moving the Dixie breaker plate forward or backward from the hammer points as desired. This feature provides additional assurance against clogging.

These are but two of Dixie's outstanding features which make the Non-Clog Hammermills the most advanced type of hammer-mill for exacting, dependable and economical operation.

**DIXIE**  
**MACHINERY MFG. CO.**

4202 GOODFELLOW BLVD. ST. LOUIS, MO.

*Take This Case*

We quote from an article on "Producing Cement in Cuba" in the *Excavating Engineer* as it describes the plant of the Cuban Portland Cement Co. . . . "A great step has been taken in the solution of the real bottleneck of quarry operation, which was the crushing plant . . . with the installation, in the early part of 1941, of a No. 7260 "Dixie" Non-Clog Hammermill, fitted with a movable breaker plate. By now this machine has worked under the worst possible conditions, operating at times for a whole week on raw material which was nothing but a mass of plastic, sticky, water-sodden mud. The output during these periods of continuous rains has been reduced, but never to the extent of delays and continuous choke-ups experienced with the old crushing equipment."

● Send the coupon below today for the free booklet, "More Efficient Crushing of Raw Materials," which gives the complete story.

DIXIE MACHINERY MFG. CO.  
 4202 Goodfellow Blvd., St. Louis, Mo.

Please send free booklet, "More Efficient Crushing of Raw Materials."

We want to crush.....

Name .....

Company .....

Address .....

City..... State.....

# Graphs Reduce Calculations

Mill loading graphs assist foremen to maintain balanced loadings. Calcimeter graph used to determine CO<sub>2</sub>

By C. J. KNICKERBOCKER

**G**RINDING efficiency is of sufficient economic importance in cement plants to make necessary the maintenance of mill grinding charges at fixed sizes and tonnages for each operation. Fine grinding often requires that mills be emptied and re-charged, and continued operation with any specific charge requires that additional weight be introduced at regular intervals. Eventually the charge is screened and undersize steel replaced. It is convenient for mill foremen to have a source of reference that will enable them to maintain balanced loadings for specific grinding operations. The graphs illustrated serve this purpose.

Chart "C" is designed for a specific operation in which the mill diameters range from 60 to 80 in. Solution by means of this graph gives values which are fully as accurate as the depth charge measurements will be.

Chart "D" covers the entire range of mill diameters usually encountered with the exception of the largest preliminary ball mills. The shaded area indicates the usual volume loading range used. As is apparent, a graph is more detailed for a given size when the diameter range is less widely spread.

### Chart "C"

In the following example, Chart "C" is used. A mill with 68 in. interior diameter has a measured charge depth of 24 in. The compartment is 90 in. long. It is required to raise the mill loading to 40 percent volume.

From the intersection of 24 in. and 68 in., a vertical line intersects the reference line representing pounds charge per inch length. From this point, through 90 on the diagonal, a straight line intersects the total charge line at the indicated tonnage. Similarly, starting from the intersection of the 68 in. and the 40 percent loading curve, the total required tonnage is located at the uppermost line on the chart. The difference in the total tonnages is the required addition. As shown, the charge depth is increased about 4½ in.

### Chart "D"

For this example Chart "D" is used. It is required to charge a mill

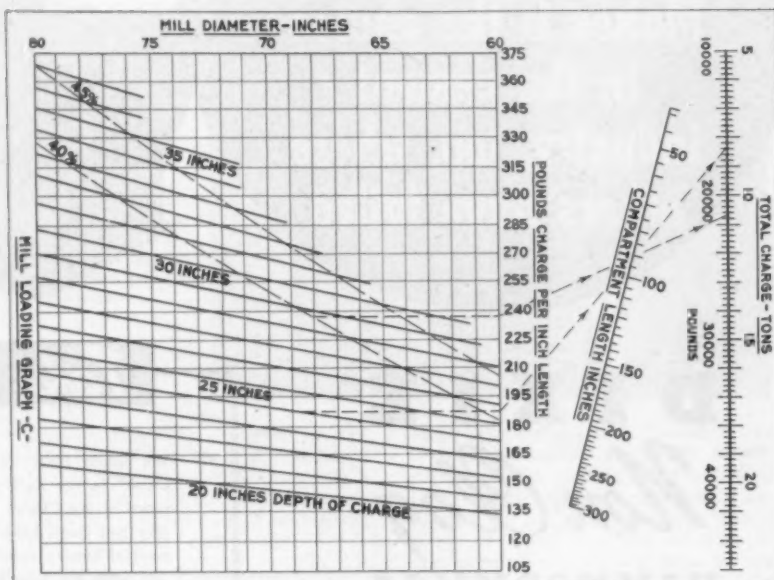


Fig. 1: Chart "C" is a mill loading graph which is designed for a specific operation in which mill diameters range from 60 to 80 in.

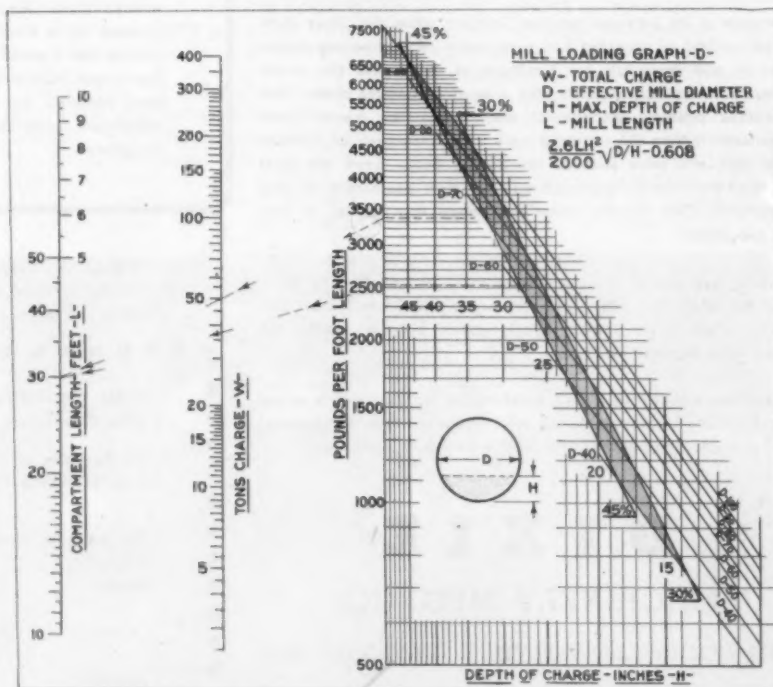


Fig. 2: Chart "D" is a mill loading graph which covers entire range of mill diameters with the exception of the largest preliminary balls. Shaded area indicates the usual volume loading range

**MORE TONS**



**per SHOVEL HOUR**

**T**HE KEYNOTE to efficient present day quarry operation is well thrown, properly broken stone in the primary blast.

Excessive secondary blasting requires labor and supplies; also it retards shovel production.

A correct burden to spacing ratio will reduce secondary blasting.

Few quarries have uniform rock strata throughout the face. Each stratum will have blasting characteristics of its own. The correct explosive for each stratum of the face is the final answer to a good blast.

Blasts should be measured by tons produced per shovel hour instead of tons per pound. Remember — a shovel swing lost in moving a large stone is never regained. Make every move count.

• Capable field engineers are available at your call.

★ **HIGH EXPLOSIVES**

★ **PERMISSIBLES**

★ **BLASTING**

**POWDER**

★ **BLASTING**

**ACCESSORIES**

## American Cyanamid & Chemical Corporation



A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.  
**EXPLOSIVES DEPARTMENT**

**SALES OFFICES:** Pittsburgh, Pa. Bluefield, West Va. Scranton, Pa. St. Louis, Mo. Chicago, Ill.  
Pottsville, Pa. Hazleton, Pa. Maynard, Mass.



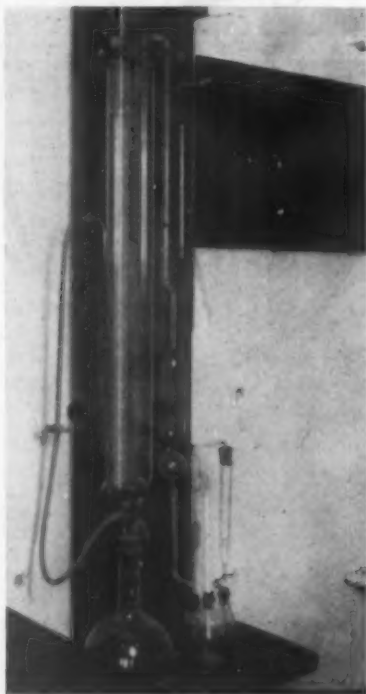


Fig. 3: Calcimetric absorption apparatus

to 45 percent volume loading. The mill has a 70 in. internal diameter, 26 in. charge depth and is 30 ft. long.

A horizontal line drawn from the intersection of the 70 in. curve and the 26 in. vertical line will intersect

the pounds per foot ordinate. Connecting this point with the length, 30 ft., the line cuts the center vertical line at the present load tonnage. The ultimate tonnage is similarly lo-

cated, starting from the intersection of the 70 in. and 45 percent curves. The difference in tonnage indicates the added charge. This is a 6 in. increase in the depth of charge.

## Calcimeter Graph

**P**RECISE  $\text{CO}_2$  determinations are preferably made with an alkalimeter, absorption assembly or combination calcimetric-absorption setup, purification of incoming and outgoing gases being assured.

For specific purposes the type calcimeter illustrated offers satisfactory results and is quickly and simply operated. Careful standardization is essential to reproducible results.

A rapid determination of the  $\text{CO}_2$  content of a cement-limestone mixture may be made with the instrument and the stone content of the sample thus determined. A more lengthy method has recently been described that is applicable to mixtures in which the stone characteristics are unknown. In many operations the  $\text{CO}_2$  bearing material is of fixed composition and the calcimeter is adaptable for the purpose.

Masonry cement operations in which weight stone feeders are not used may require frequent check weights and analyses to maintain a material proportion balance. Those operations employing dried raw mix as an inert filler may definitely ascertain the  $\text{CO}_2$  content of this material and the resulting cement and by calculation, learn their relative propor-

tions. Likewise, operations using limestone consider the stone characteristics sufficiently important that they employ selective quarrying methods or import a suitable type material. Under such conditions the stone analysis is closely defined and calcimeter test results will afford the required information.

A graphical conversion of the gas volume reading to grams  $\text{CO}_2$ , percent stone or similar values, affords an additional saving of time. (Fig. 4.)

### Example Solution

A one gram sample is analyzed; 200.0 ml. of gas are evolved, as read on the burette. Calculate the equivalent in grams of  $\text{CO}_2$ . The graphical solution is shown on the graph.

Substituting in,

$$V = P - P' / 760 \times 273 / 273 + T \times F \times V'$$

Where,

V=Gas volume—standard conditions

V'=Gas burette reading

P=Barometric pressure in mm.

P'=Aqueous vapor tension at burette temp.

T=Gas temp.—°C

F=Correction factor (percentage)

$$V = 744 - 26.5 / 760 \times 273 / 273 + 27 \times 1 / 0.93 \times 200 = 184.6 \text{ ml.}; 0.365 \text{ gm. CO}_2$$

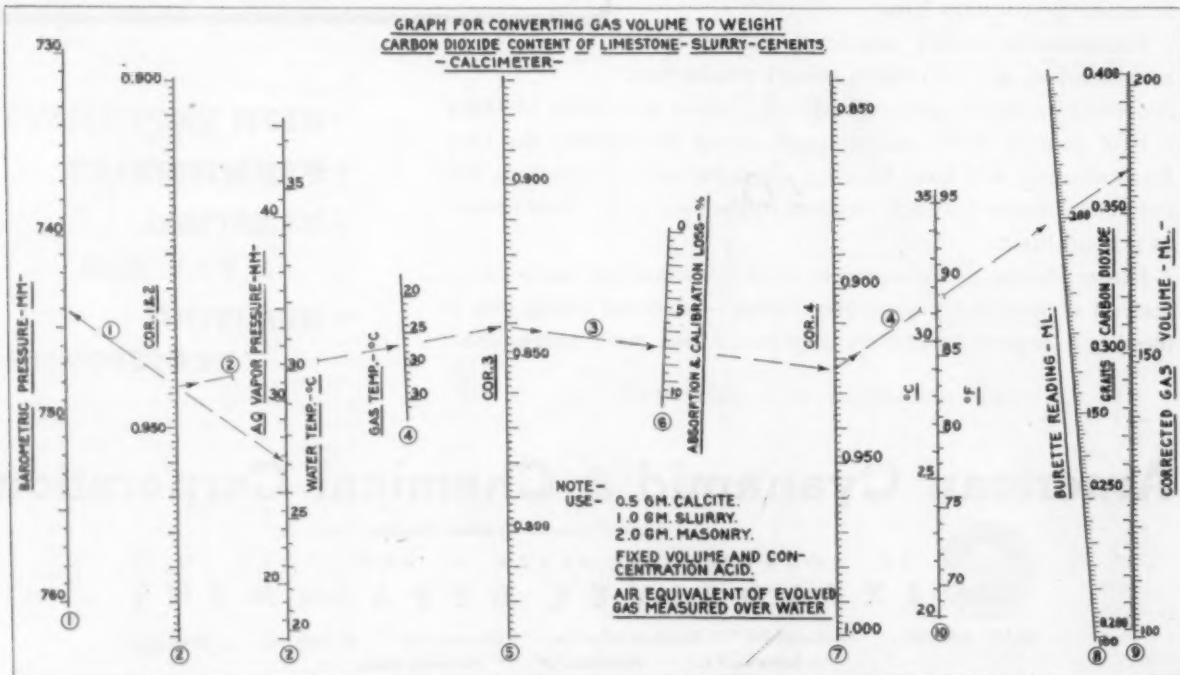


Fig. 4: Graph for converting gas volume to weight saves time in making calculations

*A field-proven fact...*

## IN CEMENT DUST RECOVERY MULTICLONE-COTTRELL INSTALLATIONS GIVE HIGHEST EFFICIENCY, LONGEST LIFE, LOWEST MAINTENANCE!



ON LARGEST CEMENT PLANT in country—Permanente—a Cottrell is handling unusually large quantities of kiln gases with uniformly high recovery efficiency, with low maintenance and with minimum operating costs.

AFTER 31 YEARS SERVICE this Cottrell installation at the Riverside Cement Co. is still giving the same high recovery efficiency and low maintenance as when first installed—typical of the long life in this equipment.

TYPICAL MULTICLONE INSTALLATION, this one at Pacific Portland Cement's Oregon Plant has already given many years of heavy duty, efficient service with practically no maintenance expense or wear.

**W**HEN laying plans for building or modernizing your cement plant, keep this important fact in mind... A cement plant is a long term investment that generally continues to operate day-in, day-out over a period of many years. And MULTICLONE-COTTRELL equipment has proven its ability to *stay on the job* year after year, collecting dust from kiln gases with high efficiency, low maintenance and trouble-free operation.

These advantages of MULTICLONE-COTTRELL recovery equipment have been proven not on just a few installations, but on dozens of the major cement plant installations throughout the country, from the smallest to the largest... and on installations located in all parts of the United States, as well as in many foreign countries.

This invaluable background of service and dependability can be of great help in assuring maximum efficiency, long life and trouble-free dust recovery in *your* plant. Let our experienced engineering staff work with you in simplifying your recovery problems.



Send for these booklets which give further details on Multiclone and Cottrell equipment.

### Important MULTICLONE-COTTRELL Advantages

Highest efficiency, approaching 100% recovery if desired  
... Minimum draft loss ... Lowest maintenance cost (all metal construction, no high speed moving parts) ... Lowest power costs ... Any capacity, a few c.f.m. or MILLIONS ... Low labor costs (fully automatic operation) ... Maximum flexibility and adaptability to varying requirements ... Minimum overall cost per year of service!



# WESTERN Precipitation CORPORATION

ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Office: 1806 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA  
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HOBART BUILDING • SAN FRANCISCO 4, CALIFORNIA  
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

# Cement and Aggregates

Chief topics discussed at New York annual meeting of A.S.T.M.

By NATHAN C. ROCKWOOD

THE 47TH ANNUAL MEETING of the American Society for Testing Materials at New York City, June 26-30, was a notable occasion for those interested primarily in cement and concrete. Not only was the program interesting and instructive, but, perhaps, for the first time in its history, the society installed as president a man whose life work has been devoted to research and development in cement and concrete—P. H. BATES, chief of the clay and silicate products division of the National Bureau of Standards, who has been chairman of the society's Committee C-1 on Cement for many years. Incidentally, he was reelected chairman of C-1 for another two years, in addition to his duties as president of the society.

PROF. W. C. VOSS, Massachusetts Institute of Technology, was reelected chairman of Committee C-7 on Lime. THEODORE I. COE, American Institute of Architects was elected chairman of Committee C-12 on Mortars for Masonry Units, succeeding J. W. McBurney, National Bureau of Standards. PROF. F. E. RICHART, professor of civil engineering, University of Illinois, was elected chairman of Committee C-9 on Concrete and Concrete Aggregates, succeeding F. H. JACKSON, senior testing engineer, Public Roads Administration.

## Revision of Cement Specifications

Committee C-1 on Cement reported some slight revisions in the A.S.T.M. Standard Specifications for Portland Cement, which were adopted. The principal changes were in the compressive strength requirements for types I and III cements, to make these the same as the present Federal Specifications for Portland Cement (SS-C-191b). These changes in strength requirements were considered necessary, because one of the recommended modifications in Method C-109, requires the mixing water content of the mortar to be adjusted according to the requirements of the individual cements. Changes were also made in the section on packing and marking.

The one-day compressive strength requirements for type III (high early strength) are reduced from 1300 p.s.i. in the previous standard to 1250 in the new; the 1 day in moist air, 2

days in water, from 3000 p.s.i. to 2500. For type I (normal portland cement) compressive strength for 3 days is reduced from 1000 p.s.i. to 900, and for 7 days from 2000 to 1800. The 3000 p.s.i. for 30 days remains unchanged. The chemical re-



P. H. Bates, elected president, American Society for Testing Materials

quirements are the same. Although under present W.P.B. regulations only types I, II and III are permitted to be manufactured, it is said that by fall the regulations will be changed to permit resumption of manufacture of the five types now covered in A.S.T.M. specifications. The fineness requirements are the same as in the previous A.S.T.M. standards. The war emergency specifications attempted to lower the minimum to 1500 as the specific surface area requirement and to set a maximum of 2000. According to popular report very little if any cement sold has been made as coarse as 1500 and the 2000 limit is frequently exceeded. There has been no specific surface requirement for type III cement for several years, on the theory that any high early strength cement must of necessity be finely ground. Complaint is heard that type I cement, finely ground, is frequently sold as a substitute for type III.

The Tentative Specifications for

Treated Portland Cement for Concrete Pavements (C 175-42T) were revised by changing the title to that given here. The revision omits the tensile strength test because of the apparent non-applicability of the standard methods for determining the amount of water for mortar. A limit has been placed on the amount of air entrained in a 1:4 mortar. Tentative methods of tests for determining the amount of entrained air and methods of chemical analysis for determining the amount of the air entraining agents are included in this year's report of the committee. To date two air-entraining agents are recognized and their use accepted by the A.S.T.M. One is "Vinsol Resin," made by the Hercules Powder Co., the other "Darex," made by the Dewey & Almy Chemical Co.

## Air-Entraining Cements

Darex is admitted as an air-entraining agent for the first time in these specifications. It is described as a tri-ethanolamine salt of a sulfonated hydrocarbon. The report of Committee C-1 contains a summary of results of investigations by a number of laboratories. These were made to compare the qualities of concrete made with Darex additions with plain concrete and with Vinsol Resin concrete in resistance to freezing and thawing, salt solutions, etc. Darex, according to two laboratories, does not increase the entrained air by longer mixing, and the mixing time had no marked effect on strengths (the mixing times were up to 30 min.).

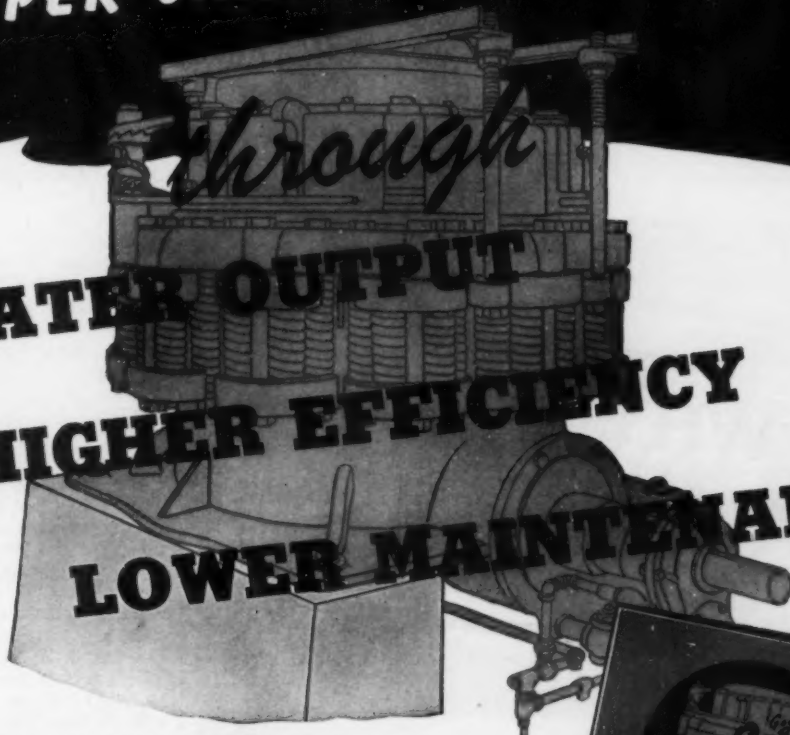
The committee report also contains the results of cooperative studies of the proposed method of test for air content in portland cement mortar. The following statement is of interest: "The data show a definite relationship of air content with amount of *neutralized* Vinsol Resin, despite the presence of cements from five different mills. The data show, also, the definite absence of a relationship of air content with amount of flake Vinsol Resin." C. E. WUERPEL, chairman of the subcommittee, which made this report, concludes: "In view of the fact that extensive field experience and laboratory tests have shown that an air content in concrete of 5 to 6 percent is the opti-

(Continued on page 126)



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(Continued from page 124)

mum for obtaining maximum workability, bleeding reduction, and durability, with a minimum of strength reduction, the tests reported show that the ratio of air-in-mortar to air-in-concrete is about 2.65. It thus appears logical to establish a limit of  $14 \pm 4$  percent for the air content in Cement Specification C 175 (already referred to). The test is made on 1:4 mortar.

Mr. Wuerpel further elaborated on "The Reaction of Vinsol Resin as It Affects the Air Entrainment of Port-

land Cement Concrete" in a paper read at the general meeting of the society, of which he and ALBERT WEINER are the authors. His tests showed that crushed-stone concretes had uniformly higher air contents than gravel concretes. His conclusions, in this paper, were:

"1. Cement, containing interground flake Vinsol Resin, entrains an amount of air in mortar which is related neither to the Vinsol Resin content of the cement, the alkalinity, nor the alkali content of the extract of the mortar.

"2. The amount of air entrained in mortar is related to the amount of Vinsol Resin dissolved in the extract from the mortar.

"3. Although an amount of NaOH is found in the extract which is in excess of that needed to neutralize all the Vinsol Resin in a cement, only a portion of the Vinsol Resin in the cement is dissolved.

"4. When neutralized Vinsol Resin (sodium resinate) is interground with cement, a good correlation is found between the Vinsol Resin content of the cement, air content of the mortar, and Vinsol Resin content of the extract from the mortar.

"5. Cements with equal amounts of neutralized Vinsol Resin exhibit no greater variability in air-entrainment than do cements containing no Vinsol Resin."

#### New Test Methods

Other work of Committee C-1 consists of a new tentative method for test for heat of hydration of portland cement; a proposed revised method of sampling hydraulic cement; a proposed revised method of test for fineness by the No. 200 sieve; a proposed revised method of test for normal consistency; soundness of cement over boiling water (pat test); time of setting by Vicat or Gillmore needles; tensile strength of mortars; specific gravity; compressive strength. Not much of the substance of these specifications has been changed but they are set up as separate standards to take the place of the respective methods which have hitherto appeared as component parts of Standard Methods C-77.

#### Theory of Air Entrainment

HENRY L. KENNEDY (Dewey & Almy Chemical Co.) contributed to the discussion on air-entraining cements with a paper "Entrained Air—Its Effect on the Constituents of Portland Cement Concretes." Mr. Kennedy experimented not only with his own company's Darex, but with three other air-entraining agents, which he divided into two classes: (1) resinous materials; (2) water-soluble wetting agents such as sulfated alcohols and sulfonated hydrocarbons. He came to the conclusion that air entrainment in neat cement pastes was only about 1 percent added air per 0.01 percent of additional air-entraining agent. Hence the cement paste is a relatively unimportant factor. Neat cement specimens are injured by contained air.

Mr. Kennedy finds the air entrainment is accounted for almost exclusively by the fine aggregate. Here is the substance of his conclusions: "For a given percentage of air-entraining agent, and constant mixing conditions, the quantity of air entrained by the aggregate is a function of the particle size of the aggregate."

(Continued on page 128)

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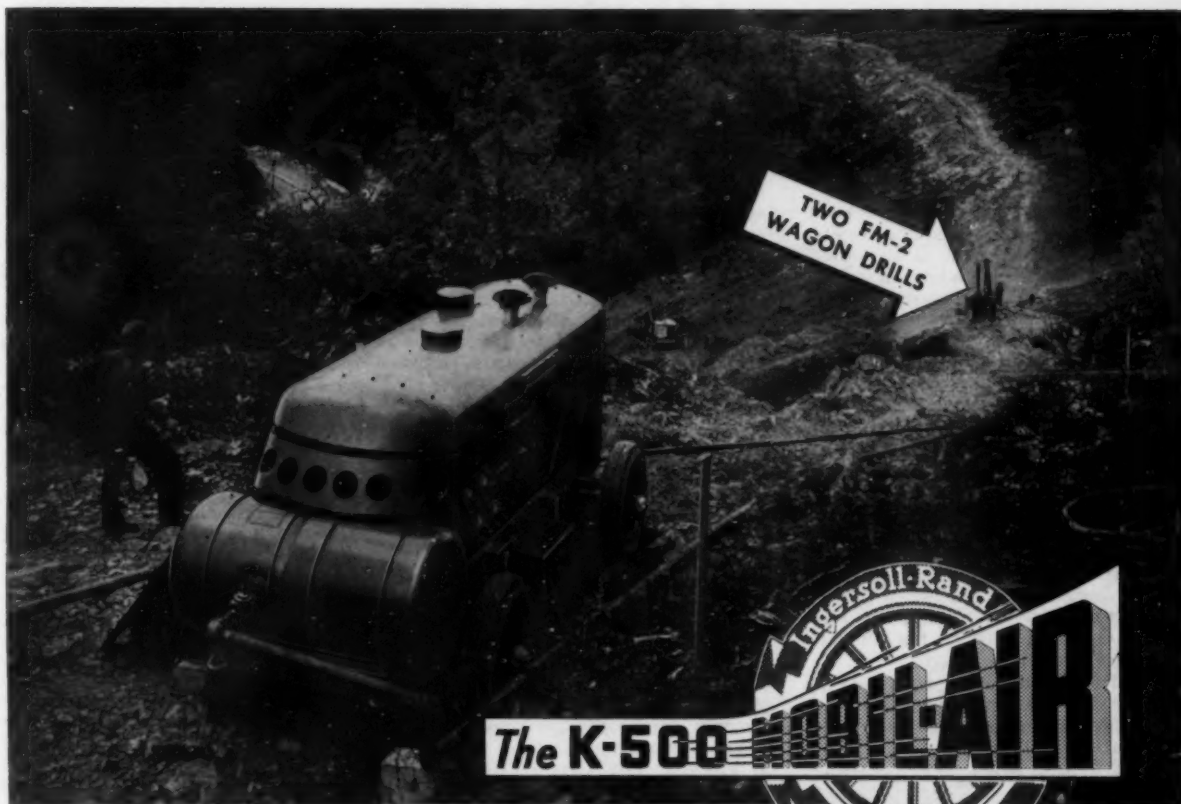
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gate, the optimum range being between the No. 30 and the No. 100 sieve sizes. A small amount of air is entrained by fractions smaller than the No. 100 sieve sizes. If the air which is known to be present in the sand passing a No. 100 sieve is not present as free air bubbles, it is suggested that such air may be adsorbed on the fine aggregate, thus contributing in no way to plasticity or durability."

The author also supplied a theory for explaining freezing and thawing resistance of concrete slabs containing entrained air, by supposing that as the water in the air bubbles freezes near the outside, the expansion squeezes the excess water into air bubbles below, and so on, ad infinitum, preventing the expansion of the water in freezing from cracking the surrounding concrete.

After emphasizing that further work should be done along these lines, and that air bubbles in concrete are no substitute for cement, he drew these conclusions:

"1. The amount of air entrained in a concrete may be varied by the gradation of the fine aggregate constituent even though the amount of air-entraining agent remains constant. The No. 50 to No. 100 sieve size seems to entrain the most air.

"2. It seems possible that the importance of the presence of a minimum amount of sand passing a No. 100 sieve which is a real factor for many ordinary concretes, may be minimized when air-entraining agents are used.

"3. One of the principal dangers of excessive entrained air which produces excessive plasticity of concrete, is the invited or inadvertent reduction in cement content to the possible detriment of other properties than resistance to freezing and thawing.

"4. The effect of air-entraining agents on the neat cement constituent points to the desirability of further research with air-entraining agents in the rich mix range."

#### Experience with Air Entraining Cements

Discussion from the floor, following the report of Committee C-1 and Messrs. Wuerpel's and Kennedy's papers brought out the following statements: Air-entraining cements may have some value in resisting the reaction between so-called high alkali cements and silicious aggregates. There is marked effect from the heat in grinding mills when using flake Vinsol Resin as the air-entraining agent. The resin, or part of it, can

be volatilized. According to Mr. Wuerpel, excessive air-entrainment does result from prolonged mixing when flake resin is the agent, but he believed the use of neutralized Vinsol Resin would cure this condition.

ALEXANDER FOSTER, JR., on the other hand, said experiments showed very slight additional air entrainment by lengthening the mixing time; nor does change in agitating speed of truck mixers appreciably change the volume of contained air. Several experimenters reinforced Mr. Kennedy's contention that the air bubbles served as fine aggregate in making for workability of concrete. These air bubbles also reduce the fine sand requirement and hence reduce the water-cement ratio. One contractor said his cement finishers did not like air-entraining cements for concrete pavements, especially in hot weather, because of difficulty in finishing.

#### Tests of 52 Cements From 15 Countries

Praise was given a paper entitled: "Comparative Tests of 52 Brands of Portland Cement from 15 Countries," by EUGENE V. BARRETT, chief, Materials Testing Laboratory, Ministry of Public Works, Venezuela. Mr. Barrett was not able to be present and there were some questions that only he could answer. However, the paper was commended because it gave a comparison of cements from different countries, including four from the United States, tested under the same conditions. All cement manufacturers will find the table of test results very interesting: It gives fineness (percent retained on No. 200 sieve), normal consistency, tensile strength (mortar briquettes), compressive strength (6 x 12 concrete cylinders, autoclave expansion, MgO, CaO, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, SO<sub>3</sub>, insoluble residue and loss on ignition. The best cement, judged by these tests, came from Yugoslavia.

Mr. Barrett's conclusions are of general interest:

"1. The expansion in the autoclave test does not bear any direct relation to the total MgO content of the cement.

"2. The tensile strength of briquets at 7 days usually bears some relation to the 7-day compressive strength of concrete cylinders made with a constant water-cement ratio, but the discrepancies are so frequent and of such magnitude that the 7-day briquet strength cannot be considered a reliable index of cylinder strength.

"3. The 28-day briquet strength does not appear to bear any relation to the 28-day concrete cylinder strength.

"4. The 7-day compressive strength of constant water-cement ratio concrete cylinders made with the brands

(Continued on page 130)

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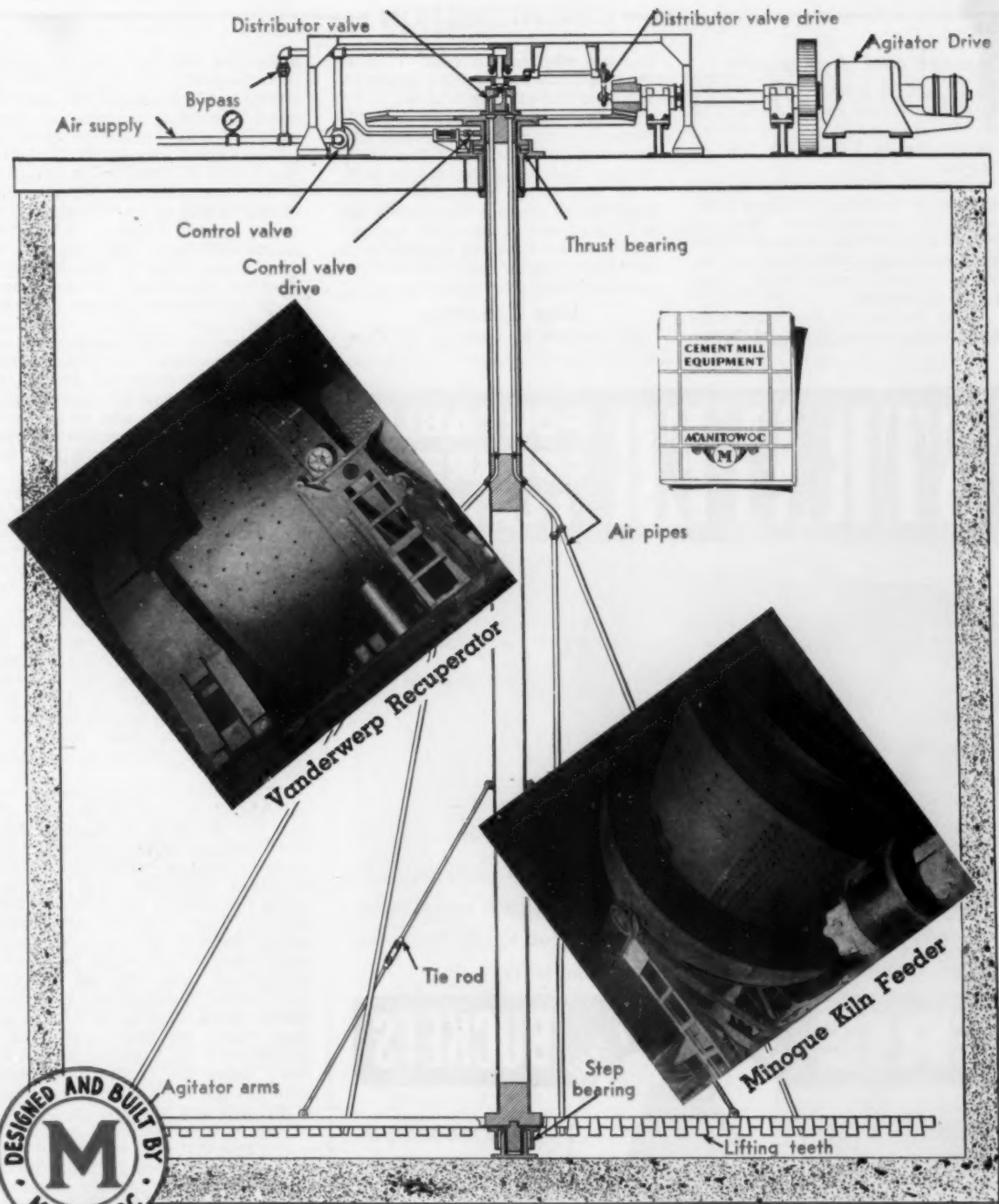


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## CEMENT SECTION

### Cement and Aggregate

(Continued from page 128)

of cement tested varied from 1180 p.s.i. to 3045 p.s.i. and the 28-day strength varied from 1985 p.s.i. to 3640 p.s.i.

"5. The water-cement ratio strength relationship varied so widely for the brands of cement tested that an average cement ratio-strength curve would have very little value for designing concrete mixes with these brands of cement.

"6. On the basis of the 7-day concrete cylinder strength the minimum

increase in strength from 7 to 28 days was 16.6 percent, the maximum 76.8, and the average 37.6.

"7. The autoclave expansion of 0.50 percent required by the A.S.T.M. Specification for Portland Cement (C 150-42) is a reasonable requirement.

"8. Most of the 52 brands of portland cement tested complied with the A.S.T.M. Specifications that were effective at the time the cements were tested, and several countries produced excellent quality portland cement."

#### Lime Committee

Attendance at meetings of Com-

mittee C-7 on Lime and its various subcommittees was about the best in several years. Progress was made in many directions, including an overall specification for lime for chemical and industrial uses. R. W. McALLISTER, Arthur D. Little Co., is chairman of this subcommittee. Most of the discussion had to do with definitions of the various forms or varieties of commercial lime. The over-all or master specification for lime for chemical industries is now about ready for submission to all members of Committee C-7 for a free-for-all discussion. In this specification an attempt has been made to devote one section to describing the general requirements for lime for miscellaneous chemical purposes, and to list in a special requirements section the particular requirements which the lime should have to meet special uses.

Dr. G. J. FINK, research associate for the National Lime Association at the National Bureau of Standards, contributed a paper, "The Effects of Certain Variations in Consistency and Curing Conditions on the Compressive Strengths of Cement-Lime Mortars," of which he gave a brief summary at the recent meeting of the board of directors of the National Lime Association (reported in *Rock Products*, June issue, p. 110). His paper had more to do with test methods and results than commercial data, but this conclusion is significant:

"With relation to specification requirements, it may be pointed out that the minimum 28-day compressive strength values for the four types of mortars established by the American Standard code requirements for masonry are 2500, 600, 200, and 75 p.s.i. whereas the lowest values obtained for the corresponding mortars in the present tests were, respectively, 5155, 1225, 445, and 225 p.s.i. Other investigators have reported values for some of the mortar types which are more nearly comparable with the Code values, but in many cases the conditions of test were not the same as those specified in the code and were such as to contribute to lower strength values. It is also true that only one cement and one sand were used in the present tests and that the absolute extremes of proportions were not reached. However, since these tests include a fair cross-section of masons' lime, the indications are that the values fixed by the Code may be somewhat lower than necessary to admit cement-lime mortars made from the majority of commercial limes, combined with cement and sand similar to those used in these tests."

#### Concrete and Aggregates

Committee C-9 on Concrete and Concrete Aggregates closed a particularly active year with many re-

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visions to its tentative and standard test methods. Aggregate producers will be glad of a revision in the Tentative Method of Test for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate (C-88-41T), since this test has cost much tribulation. The revision is as follows:

**Section 1.**—Change the section on scope to read as follows by the addition of italicized words and the omission of those in brackets:

1. This method covers the procedure to be followed in testing aggregates to determine their resistance to disintegration by saturated solutions of sodium sulfate or magnesium sulfate. It furnishes information helpful in judging [of] the soundness of aggregates subject[ed] to weathering action, *particularly when adequate information is not available from service records of the material exposed to actual weathering conditions.* [In selecting aggregates, consideration should be given to service records of the materials when exposed to actual weathering conditions over a period of at least 5 yr., but, in the absence of such information, the test method should be used as the basis of acceptance or rejection of the material. Either or both of these methods may be used. However,] attention is called to the fact that the test results by the use of the two salts [methods] differ considerably and care must be exercised in fixing proper limits in any specifications which may include requirements for these tests.

This revision obviously makes service tests the criterion, and the sulfate test is given credit only as furnishing "information helpful in judging the soundness of aggregates." The Tentative Method of Test for Soundness of Aggregates by Freezing and Thawing (C-137-38T) was temporarily withdrawn that it might be revised in line with more modern laboratory practices. The rest of the report has to do mainly with methods of making and curing test specimens of concrete.

J. C. PEARSON, director of research, Lehigh Portland Cement Co., submitted a report on "Volumetric Method for Determining the Air Content of Freshly Mixed Concrete." This had nothing to do with air-entraining cements. It was concerned entirely with laboratory methods and calculation of results.

The committee report also contains a revised specification for a method of test for the weight per cubic foot, yield, and air content (gravimetric) of concrete; and a tentative method of test for surface moisture in fine aggregate. Both these, of course, are of much interest to ready-mixed concrete producers.

Other papers on concrete had to do with testing methods and mathematical analyses, of interest and value to design engineers but not particularly so to manufacturers of concrete ingredients.

### Grant Quarry Permit

KEN ROYCE CONSTRUCTION Co., San Francisco, Calif., has been granted a permit to open a quarry and set up a crushing plant at Rockaway Beach near Redwood City, Calif.

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K-7—Partially assembled Nose Ringshield.

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## CEMENT SECTION

(Continued from page 79)

like to add that we feel that we may make modifications of our requirements for portland cement in order to eliminate several of the consistently inferior brands of cement which meet the standard specifications as given in A.S.T.M. C 150. This might be accomplished by several means such as to require the mills to use recording pyrometers and to burn above a minimum temperature to be established by us. A maximum autoclave expansion of 0.15 percent would not eliminate too many of the

mills serving our State. The use of a minimum requirement for strength of concrete in flexure using standardized coarse and fine aggregates, consistency, proportions and controlled laboratory conditions is not unreasonable to my mind, and I hope to develop our specifications for portland cement for use in road construction along these lines. How soon it can be accomplished I do not know. From conversations with several other State Highway Materials Engineers I have gained the impression that they are anticipating similar modifi-

cations of the Standards.

"Air-entraining cements have definite advantages, especially as a means for increasing the durability of concrete. It is also excellent as a plasticizer. The accompanying reduction in strength of the concrete, however, has been one of the chief objections to the use of air-entraining agents. There is some promise now, I believe, that this objection may be largely if not entirely overcome in the future. If the use of air-entraining cement does not affect the economics adversely I believe it will come to be used generally, even in those localities where durability or resistance to weathering is not a major consideration. The elimination of bleeding of concrete, affected by the use of air-entraining cement, is a desirable feature in any concrete whether for pavements or structures. At present, however, I believe the strength reduction is too great to be disregarded except where weather or the action of chlorides or sulfates is of greater importance."

In commenting on air-entraining cements, the materials engineer of a northwestern State had this to say:

"In the northern States where climatic exposure is severe, air-entraining cements will be used extensively in pavements. It appears likely that air-entraining cements also will be used in thin structural members and deck slabs of bridges and other structures. At the present time it appears that air-entrainment will be accomplished either through the use of treated cements or by the introduction of air-entraining compounds into the batch at the time of mixing."

In his general remarks about cement and concrete, the chief highway engineer of one of the largest midwestern States said:

"A.S.T.M. Type I, Type I-A, and Type III cements are now admitted under our own specifications and are being used in the types of construction to which they are best suited. Type III has been used in comparatively large quantities for the past few years, but a feeling of uncertainty is growing as to its durability, and unless something develops to dispel this feeling, its use is likely to be restricted in the future."

The chief engineer of one of our eastern States prophesied that air-entraining cements will enjoy increased use both in pavements and structures if there can be found some way to bring their strength up to normal. He remarked generally:

"Further in connection with the use of portland cement after the war, it is my belief and the expectation of the State Highway Department, that they will make more careful tests with their own department and base these tests on strength and durability, even if they have to pay higher

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**SLURRY PUMPS**

Outstanding for their maintained efficiency, slow wear and low operating cost, Morris Slurry Pumps are setting new records in today's expanded bauxite and alumina mining programs. At the new Hurricane Creek alumina plant of the Aluminum Ore Company in Bauxite, Arkansas—said to produce the highest output of alumina from the lowest grade of bauxite being processed today—nearly 300 Morris pumps are regularly handling slurries with an exceptionally high content of silica, iron oxide and titanium oxide.

Loss of efficiency is remarkably low because the running parts of Morris Slurry Pumps are simple and rugged, designed to handle slurries of high specific gravities at high heads. Suctions of large diameter and impellers with easy entrance curves permit flow of thick mixtures without choking or excessive friction. The important patented feature of Morris hydraulic design—the *pressure balanced impeller* providing minimum turbulence of flow and maximum efficiency—contributes to the long life of the wearing parts.

**MORRIS MACHINE WORKS**

Baldwinsville, N. Y.

**MORRIS**

**CENTRIFUGAL PUMPS**

Be sure you have the right pump design to suit the specific gravities, particle size and density of solids in the slurries you have to handle. Get all the facts. Write now for Morris bulletin No. 173, containing performance tables, specification requirements and other data.

prices to get the best products. It is a well-known fact there is considerable variation in brands now marketed.

"I find among highway engineers there are quite a number who put a large question mark after the present-day cements as compared to those in use many years ago, particularly with respect to durability."

**Southern States' Problems**

In one of our southern States which is subject to considerable freezing temperatures, the Chief State Highway Engineer said:

"In my opinion we will use normal portland cement for structures and pavements in the southern part of the State. In the central and northern parts of the State, we expect to use air-entraining cement in pavements and possibly bridge handrails and bridge floors. We have done a considerable amount of research work on air-entraining cements and will no doubt specify portland cements with vinsol resin or portland cements with natural cement containing a grinding compound."

**Northern States' Problems**

The construction engineer for a northern State said, in part:

"Insofar as we can see now, if the cement that will be manufactured in the post-war era will be comparable to that made previous to the war, for our own purposes we do not believe it will be necessary to have more than three types of portland cement, and they are the so-called normal or standard portland cement, high early strength portland cement, and air-entraining cement. It is believed that if the air-entraining cement can be developed to the point where there will be more uniformity in its properties that a more widespread use thereof for general paving work will be made, especially in regions where icy conditions prevail. We have had some experience with this type of cement and apparently so far it has yielded rather satisfactory results in paving work. However, we would not be in a position to indicate as to whether this material would be adaptable to structures because we have had no opportunity to observe its reaction under service conditions to which it would be exposed in structure work."

The chief of the laboratory of a New England State wrote as follows:

"It is probable that either 'treated' (vinsol-resin or Darex air-entraining types) or 'natural' blend cement will find an increased use for pavements for chloride resistance.

"Our own requirements could probably be restricted to Type II for structures, either 'natural' blend or 'treated' for pavements and high-early for special purposes, allowing Type I as an alternate for Type II for unexposed conditions."

## Post-War Cements

(Continued from page 108)

to additional expense by finicky buyers who want cement manufactured according to their own peculiar specifications. However, with only 70 percent of capacity utilized under the peak demand of 1942, and the prospect that most of the half dozen old plants, which have been or will be dismantled, will be replaced by new and modern plants, it appears rather optimistic to believe that a sellers' market will long exist, generally, although there may be sections of the country where conditions will be favorable. There is also the threat of cement importations, although this time foreign manufacturers will have no advantage in the quick-hardening properties of their cements.

That is the problem of the industry at present and likely to remain the problem for the next few years—economical production of good all-around portland cement. More care in manufacture all along the line is undoubtedly the answer; and whether the Northampton plant already referred to so often (because it is the newest plant) is any guide to future processing or not, it is an indication of the growing appreciation of the necessity for control of processing.

## China's Cement Industry

(Continued from page 110)

air-swept tube mill, which was originally a coal mill for a 600-bbl. plant, served the purpose of both raw grinding and finished cement clinker grinding. Calcination is carried on in what may be called a semi-automatic shaft kiln. This kiln is 3 meters in diameter and 10 meters high, and is made of concrete with a firebrick lining. A high-pressure fan blows in the combustion air which insures thorough burning of the raw material into well-burnt clinker.

Raw material briquettes, made on a simple machine, and coke are continuously charged into the kiln by hand. Clinker is discharged intermittently from the sealed doors at the lower part of the kiln. This kiln has a capacity of 100 bbls. of clinker every 24 hours. Coke consumption is about 25 percent by weight of the

well-burnt clinker. Cement produced with this simple set-up can meet the requirements of specifications for portland cement in any of the leading countries. All the machinery of this plant weighs but 60 tons and can be transported by twenty 3-ton trucks. These plants can be erected in a few months' time. It is true that they are far from efficient and must be abandoned when the war is over.

Both private and government circles have taken up the question of post-war economic reconstruction in China, but this broad problem is out of the scope of this article. As far as the post-war cement industry is concerned, the writer dares to predict that there will be a considerable expansion of new works in addition to the restoration of the cement plants in the occupied area. In the opinion of the writer, the following new cement plants will be constructed during the first five years after the war is over:

No. of New Plants to Be Built	Daily Output in Barrels	Main Machinery for Each Plant	Process
6	900	1 rotary kiln and 2 mills	Semi-wet
3	1200	1 rotary kiln and 2 mills	Semi-wet
2	2400	2 rotary kilns and 2 mills	Semi-wet
2	4200	2 rotary kilns and 2 mills	Slag cement

## The Williams "SLUGGER" Crusher and Pulverizer Handles "ONE MAN" Stone • Saves Sledging Also Makes 1 1/4", 3/4" or Agricultural Limestone in One Operation



By reducing large rock to 1 1/4", 3/4" or agricultural limestone in one operation, the "Slugger" has enabled operators to produce these sizes at a low cost per ton and with small investment.

Features include—Manganese steel hammers, heavy duty bearings, adjustable breaker plate, hammer adjustments overcome wear, economical to operate.

The "Slugger" is built in Seven Sizes—from 30 to 150 horsepower—write for illustrated bulletins today.

**The Williams Patent  
Crusher and Pulverizer Co.**

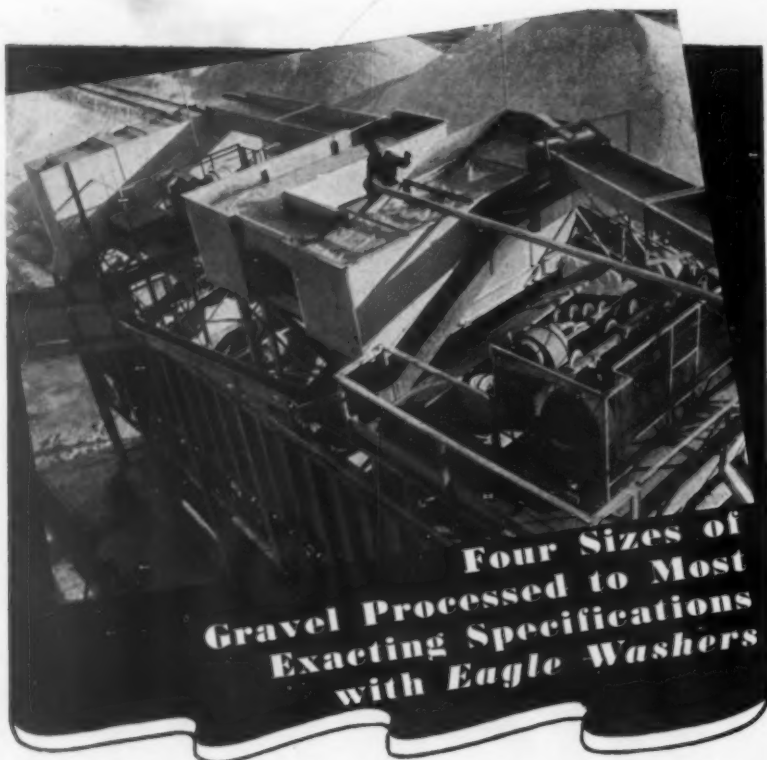
800 St. Louis Ave., St. Louis, Mo.

SALES AGENCIES  
CHICAGO NEW YORK OAKLAND, CALIF.  
37 W. Van Buren 15 Park Row 1629 Telegraph Ave.



**WILLIAMS**  
OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD  
**WILLIAMS**  
PATENT CRUSHERS GRINDERS SHREDDERS

CUTAWAY VIEW  
of "Slugger" showing  
heavy duty hammers,  
liners and discs.



The President of a leading Iowa gravel company writes: "Some twenty years ago we purchased our first Eagle Washer and have used them continuously since that time. At present we have a battery of four Eagle Washers in operation. In cost of operation and efficiency in removing objectionable material from the gravel, they have proved

very satisfactory. In our present operation we process four different sizes of gravel and all of them will meet the most exacting specifications, thus testifying again to the efficiency of the Eagle Washer."

#### EAGLE IRON WORKS

137 Holcomb Avenue  
DES MOINES, IOWA

### 50% Greater Efficiency from Eagle Dehydrators

Eagle Dehydrators provide 50% more dehydration than conventional sand drags—and have a greatly reduced operating and maintenance cost. Dehydrating sand up to 100 mesh, moisture reduction to 9 or 10% is readily possible. Let us give you complete details on sizes and capacities.



#### EAGLE Specialized Sand and Gravel Equipment

"SWINTEK" DREDGE LADDERS — SCREW WASHERS  
LOG WASHERS — DEHYDRATORS — SAND TANKS  
CLASSIFIERS — REVOLVING SCREENS



**EAGLE IRON WORKS**  
DES MOINES, IOWA

"SERVING INDUSTRY FOR OVER SEVENTY YEARS"

### Slag Statistics

BUREAU OF MINES reports the total output of air-cooled, screened and unscreened, water granulated, and lightweight slag for 1943 was 16,507,606 short tons as compared with 19,122,718 tons for 1942. Sales of air-cooled slag were 4 percent less in 1943 than in 1942, and the average value per ton of screened declined 2 cents and unscreened 3 cents. These figures are based on a canvass, conducted by the National Slag Association, of the thirty-two companies that prepare blast furnace slag for commercial use. The results of this canvass were assembled in cooperation with the Bureau of Mines, United States Department of the Interior.

Air-cooled slag was used principally in the construction and maintenance of highways, access roads, airport runways, defense plant and housing projects, miscellaneous structures, and as railroad ballast and sewage trickle filter media.

Practically all of the commercial output is produced east of the Mississippi River, chiefly at steel centers located in Ohio, Alabama, Pennsylvania, and Illinois. Shipments, however, are made into all states east of the Mississippi except some of the New England States outside the economic range of sources of supply.

The average shipping range of blast furnace slag in 1943 was 57 miles by rail, 14 by truck, and 157 by waterway. In most instances shipments did not exceed 100 miles by railroad, 30 by truck, and 230 by waterway.

During the process of crushing and screening blast furnace slag, particles of metallic iron which escape through the slag notch of the blast furnace are recovered at the slag plant by means of hand-picking and magnetic pulleys. During 1943 the companies surveyed reported 154,207 tons of metallic iron recovered and returned to the furnaces to bolster the supply of metal so vitally needed in the prosecution of the war. The yield is slightly in excess of 1.1 percent or approximately 23 lbs. of metallic iron per short ton of slag processed.

### Buys Wisconsin Quarry

BUCKLEY SAND AND GRAVEL CO., Wilmet, Wis., a subsidiary of the Material Service Corp., Chicago, Ill., has purchased a quarry just west of Burlington, Wis., from Carl Backlin. The Material Service Corp. has plans to modernize the quarry as soon as equipment can be purchased. A building stone, known as Sunset stone, has been quarried. It is planned to continue production of this stone after the war, but the spalls and waste stone will be made into agricultural limestone.



AUGUST 1944

ROCK PRODUCTS'

# CONCRETE PRODUCTS AND CEMENT PRODUCTS



- Interior view of Cinder Products Corporation plant at Providence, R. I. Note neat arrangement of machinery with respect to curing kilns and power control board

# Precast Units

## CONCRETE FLOOR AND ROOF SLABS Made on a Pipe Machine



Fig. 1: Prestcrete tile in stockpile. Tee tile in foreground and standard tile in rear

A NOVEL DESIGN of prestressed reinforced concrete slabs, sold under the trade name "Prestcrete," has been developed by the Illinois-Wisconsin Concrete Pipe Co., Chicago, Ill. Approximately 200,000 sq. ft. have been erected in 40 installations including dryer tunnels for 18 hemp mills for the Commodity Credit Corporation; warehouses for the Borden Co., Hampshire, Ill., and W. F. & John Barnes Co., Rockford, Ill., the latter built by the Defense Plants Corporation. Also model houses for the Curtis Candy Co. farms, and the Naval Relief Association, Great Lakes Naval Training Station, Great Lakes, Ill.

Prestcrete slabs are an assembly of precast concrete units, the ends of which are accurately ground in specially designed grinding machines to provide a uniform bearing of the abutting ends. Grooves are provided near the bottom of the units to receive and maintain two steel rods in exact position—see Figs. 1 and 2. The slabs are made in lengths to provide clear spans up to 24 ft. by placing steel thrust plates or washers at each end of the slab. The steel rods are threaded at each end and extend through the thrust plates. Nuts are screwed on the rods against the thrust plates and the steel rods are prestressed with torque wrenches, which are calibrated against a Huggenberger strain gage, for the several sizes of steel rods employed. Thus the steel can be prestressed to any

Illinois-Wisconsin Concrete Pipe Co., develops prestressed, reinforced concrete slab design, units of which are made on packer head pipe machine

By M. W. LOVING

desired extent and the concrete placed in compression in the same operation. Two test panels, each 24 ft. 8 in. in length are shown in Fig. 3 and from this illustration and the drawing, Fig. 2, the reader can see how the units are assembled.

### Make Units on Pipe Machine

The units are manufactured in 3 ft. lengths on a McCracken concrete pipe machine by what is known as the packer head process. The packer head compacts the concrete under very high pressure against heavy steel forms or jackets. The jackets are made in two halves and are securely locked together to provide the form of the external surface of the units; the hollow core being formed by the packer head. After the units are removed from the machine and placed in the curing rooms the jackets are immediately removed. The concrete mixture used in the manufacture of prestcrete units is rich in portland cement, mixed for more than three minutes with properly graded fine and coarse aggregates and about 3.5 gal. of water per

sack (94 lb.) of portland cement. This is known as a semi-dry concrete mixture and when the units made with it are steam cured for approximately 48 hours and properly aged, the strength of the concrete ranges from 5,000 to 6,000 p.s.i. or more. The higher temperature (about 90 to 100 deg. F.) of steam curing accelerates the hardening of the concrete, and the moisture provided by the steam assures proper hydration of the cement. The units are of two types, "standard" and "tee", illustrations and drawing of which accompany this article.

About 2,500 ft. of prestcrete tile are produced in 8 hours on a McCracken machine.

Official tests of twelve panels each composed of three prestcrete slabs, grouted together and three individual slabs tested for shear were made for the Illinois-Wisconsin Concrete Pipe Co., at their plant in South Beloit, Ill., on May 20 and June 21, 1944, by Professor Kurt Wendt and Dr. George Washa of the University of Wisconsin, Madison, Wis. Many

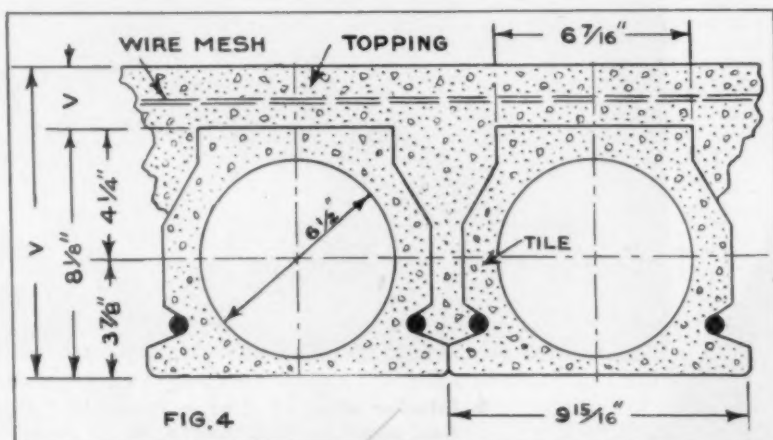


Fig. 4: Cross section of grouted slab using Tee tile with topping

## PRECAST UNITS

prominent structural engineers, including representatives of the Portland Cement Association and steel manufacturers witnessed the tests. Magnus Gunderson, consulting structural engineer, Chicago, Ill., was present as a consultant for the Illinois-Wisconsin Concrete Pipe Co. Mr. Gunderson was for many years chief structural engineer for Graham, Anderson, Probst & White, nationally known architects who designed and supervised the construction of the Merchandise Mart, the Civic Opera Building, the new Chicago Post Office and other great structures in Chicago and elsewhere.

These tests fully sustain the theory and calculations on which the slabs are designed. Engineers who witnessed the tests were particularly impressed by the relatively small deflection, recovery of the panels from deflection when loads were removed and by the strength of the slabs in shear.

### Advantages of Prestcrete Slabs Emphasized by the Manufacturer

1. A substantial saving in time, form lumber, steel and overall costs are effected by the use of prestcrete slabs.
2. Any required prestress can be applied to the steel and through it the concrete is precompressed. The working stresses of both the steel and concrete are controlled within the limits prescribed by building codes by prestressing to exact formula.
3. Very accurate positioning of



Fig. 3: Test panels 30 in. wide and 24 ft. 8 in. long. Shows standard tile, no topping

tension steel is assured by the grooves cast in each unit of the slab, which support them during assembly and facilitates handling of the slab before and during erection. Grooves also provide a substantial spline or key between slabs when grouted in place.

4. Prestressing the steel rods near the bottom of the slab places the concrete below the neutral axis under an initial compression and creates a slight tension in the concrete above the neutral axis which is resisted by steel rods placed near the top of the slab to permit handling and transportation to the point of erection. When slabs are erected in their final

position the top steel may be removed.

5. Negative bending moments may be provided for by steel rods placed in the top grooves of standard tile (see Fig. 2). Generally, however, when negative bending moments are not to be encountered the top or handling steel is placed above the top of the slab and supported by special brackets extending to and resisted by the thrust plates—see Fig. 2, lower right.

6. The positioning of slabs and the application of loads for which they are designed results in the transfer of compressive stresses in the concrete from the bottom to the

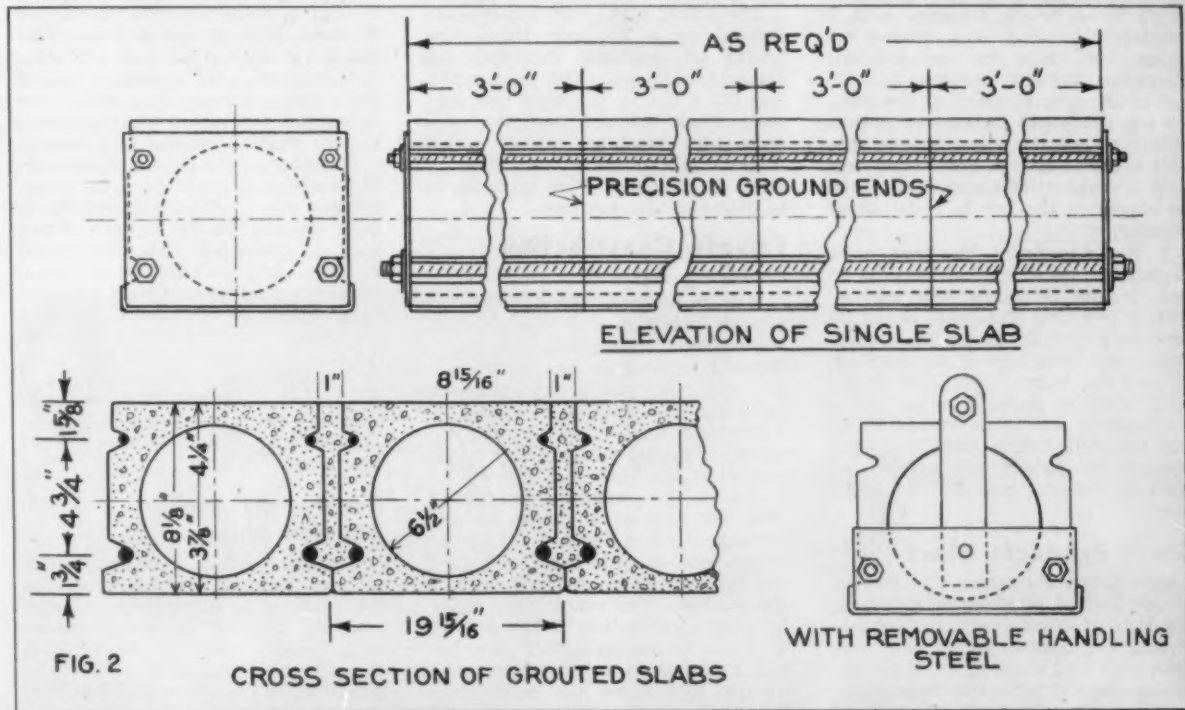


Fig. 2: Standard tile assembly with steel for negative moments; removable handling steel is generally used



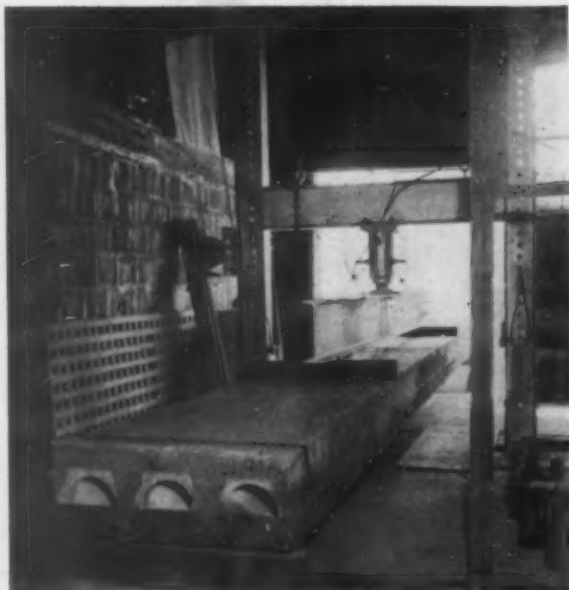


Fig. 5: Panel in testing machine. Load applied at quarter points through steel beams



Fig. 6: Group of engineers and company officials who witnessed tests at South Beloit, Ill., plant, May 20, 1944

top of the slab. Thus the tensile stress in the steel, resulting from the precompression of the concrete, becomes available for resisting stresses due to bending moments to such a degree that the working stress of the steel is only slightly more than the original prestress.

7. The joints of units in adjoining slabs are staggered to provide a masonry bond, which together with a substantial concrete key, formed between the slabs by the grouting operation further insures the required shearing strength of the slabs. An attractive tile-like pattern is thus presented on the lower side of the roof deck. In special cases bent steel bars or welded steel wire fabric may be placed in the key to resist shear stresses.

8. Slabs made of Tee type units permit the use of concrete topping to any desired thickness (see Fig. 4) with a resulting Tee-beam structure extending directly to the prestressed steel rods. This type of construction is used for heavy loads, long spans and industrial floors or when piping or conduits are to be embedded in the slab. Prestcrete slabs are fully covered by patent applications by Karl C. Schmidt and J. D. Mollendorf.

## Start Products Plant

GRAYSTONE MATERIALS CO., located at the foot of Washington street on the Port of Olympia fill in Olympia, Wash., has opened up its new concrete pipe and block plant which replaces the Olympia Concrete Products Company plant which was damaged by fire some time ago. W. S.

Wilson and W. F. Paddock, co-owners, have built what is believed to be one of the most modern plants in the Pacific Northwest. The plant is now busy on government orders, but will also be able to supply civilian needs for ready mixed concrete, concrete products, sand and gravel, plaster, clay products, and concrete paints and finishes.

The office, plant and bunkers are located on a 2½-acre tract. Five trucks are available, including two for transit mixers. The main building, 80- x 100-ft., houses a new concrete block machine and two concrete pipe machines which permit manufacture of pipe from 3-in. to 48-in. in diameter. Pipe up to 60-in. in diameter also are cast.

## Private Construction Holding Up

WAR PRODUCTION BOARD statistics recently released show that private construction throughout the United States is holding its own while military and other public construction is declining according to schedule.

Although total United States construction during May and June remained at less than half the volume reached in the comparable months of 1943, the slow seasonal rise in private construction begun in the spring of this year continued through June and is expected to continue through the summer. The preliminary figure for total construction of \$320,000,000 in June is approximately two per cent higher than the May figure, and six per cent above the April level. It is expected that this rise in construction will continue through July.

Due primarily to the extremely tight position in lumber, total construction activity for the year is expected to be only about \$3,550,000,000 or 46 percent of the 1943, and 27 percent of the 1942 volume.

Military construction (camps, air fields, storage facilities, etc.) remained about constant during the last two months, totaling \$64,000,000 in May as compared with \$65,000,000 in June. This compares with \$241,000,000 in May, 1943, and \$217,000,000 in June, 1943. Construction of Government-financed war plants and delivery of machinery and equipment to war plants continued to decline.

During the same period, other public construction (industrial, highways, schools, etc.) totaled \$196,000,000 in May, and \$197,000,000 in June of this year, as compared with \$607,000,000 in May, and \$558,000,000 in June, 1943.

In the similar period, private construction showed no such serious decline. During May, 1943, this class of building totaled \$126,000,000 and in June, \$138,000,000. For the same months of this year, volume totaled \$118,000,000, and \$138,000,000, respectively.

## Ready Mix for Bauxite Plant

BIG ROCK STONE & MATERIAL CO., Little Rock, Ark., has been awarded the contract to furnish ready mixed concrete for the Bureau of Mines bauxite pilot plant to be built at Bauxite, Ark. This plant will include filtration equipment, water softening apparatus, magnetic separation units, and crushing plant.

# Merchandising

## Sell Block Through Country Dealers



Block plant of Steward & Silver with ample storage capacity for aggregates in four concrete silos

WITH 18 country dealers situated within a 50-mile radius of their concrete block plant, Steward and Silver, Columbus, Ohio, did a farm business in 1943 that amounted to 40 percent of their output. Sales promotion plans now under consideration should send the farm percentage even higher during the coming year, despite the fact that the plant is located in a metropolitan area.

The Ohio farm market is important. The 233,783 farms in the state produced an income of \$698,463,000 during 1943, an increase of 16 percent over the preceding year. Many of these farms need improvements, therefore a large part of this income has been earmarked for new barns, new hog houses, new damp-proof storage houses and new chicken houses. Many of the farmers are planning barn repairs which are

practically as important to the concrete block manufacturer as new barns since they will be set on high concrete block foundations. With general construction nearly at a standstill the surrounding farming areas offer a cash market for the concrete block manufacturer.

### Sell Through Country Dealers

Steward and Silver have found their principal outlet to the farm market through country dealers. Many of these sales agencies are of long standing, while others have been added in the past few years. Most of the block dealers are established in the lumber and building materials business in their communities. Some of them carry stocks of 8- x 8- x 16-in. block while others book orders that develop during the day's business. Dealers are encouraged to make

**Steward and Silver, Columbus, Ohio, operates modern concrete block plant with four large concrete stave silos, each holding 120 tons of aggregates**

the farm deliveries from the block plant through an allowance of 1½ cents a block at the yard. Steward and Silver trucks also make deliveries within a 50-mile radius of the plant.

The farm business of Steward and Silver has been a gradual development. The need for farm improvements is there but the lumber and steel for building are not available and the farmers have turned to block to solve their problems. The idea of using block for various types of farm construction has been fostered in farm journals and in many Ohio newspapers having lively farm pages. Material for the use of publishers has been supplied in quantity by the Columbus office of the Portland Cement Association. Stereotype mats, complete with line illustrations and text, are sent regularly to weekly newspapers published in farm communities. One simple milk house design that has been widely publicized in this manner has contributed to the erection of nearly 1400 structures of this type throughout Ohio in the past year. When a new concrete block milk house is erected in a community others usually follow in rapid succession. This has been discovered in other types of block construction as well.

This year Steward and Silver plan

(Continued on page 144)



Left: Radiators heat long curing rooms for concrete block. Right: Transfer track for handling loaded rock cars into curing rooms and to storage

# LEADERS in the Concrete Products Industry.

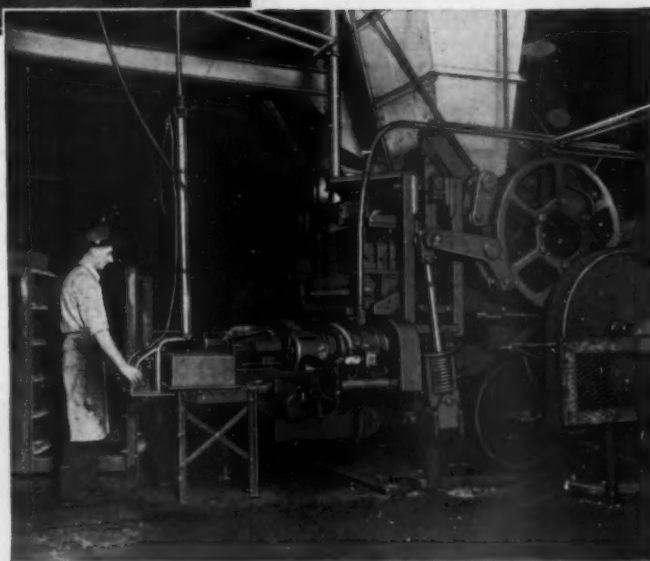


From left to right: Herbert F. Geist, President; I. C. Geist, Vice President; Mildred Geist Stuart, Treasurer; E. K. Geist, H. E. Geist and W. R. Geist.

In 1905 Herman Geist began manufacturing concrete block in a small way in Cleveland, Ohio. The business grew and in 1911 was incorporated as Geist Cement Products Company. The sale of building supplies and coal and the manufacture of clay brick and tile followed, and the name was changed to Geist Coal & Supply Company. In 1929 the clay products were discontinued. In 1934 they brought out a line of both light-weight and sand-gravel block under the generic name GEISTONE. A Besser Vibrapac was installed in July 1941. Since early 1943 this machine has operated 16 to 24 hours per week day and many Sundays, almost entirely for war production. Six members of the Geist family are active in conducting the business.



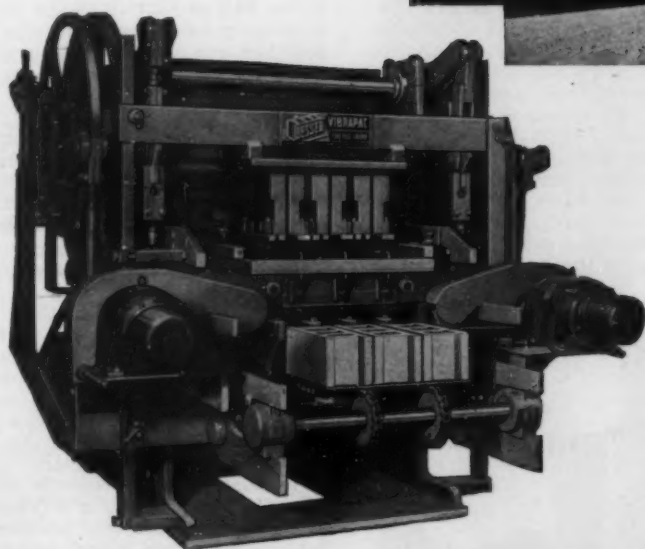
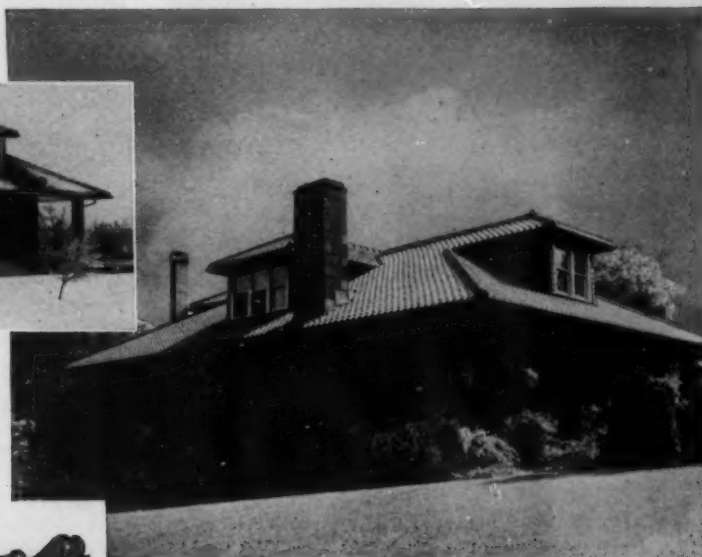
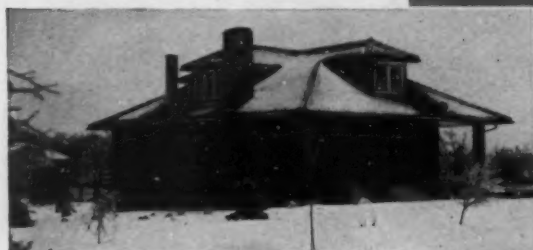
This is the 31st of a series of advertisements featuring leaders in the concrete products industry who have installed Besser Vibrapacs to step up production of high quality concrete masonry units. Reprints of previous advertisements sent on request.



— using Besser Plain Pallet  
**VIBRAPACS**  
in War Production



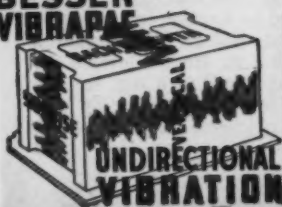
# Concrete Masonry Units And The Test of Time



Besser Super Automatic Plain Pallet Vibrator. Capacity 400 8"x8"x16" per hour made 3 at a time on one plain pallet. Smaller units made in larger multiples on the same pallets.

This typical example of the DURABILITY of concrete masonry units was built about six months before the first picture was taken in the winter of 1908. Now, after thirty-six years, the walls are in perfect condition on both exteriors and interiors. Mr. Charles C. Chopp of Cleveland, Ohio, built and lived in it several years before selling to the present owner. With time and landscaping, it has developed into a beautiful suburban home.

**BESSER  
VIBRAPAC**



## Important Patent Notice

Licensed under the Gelbman basic vibration patents.

Undirectional vibration licensed under Flam patents.

The Vibrator combines vibration with exclusive patented Besser Plain Pallet principle.

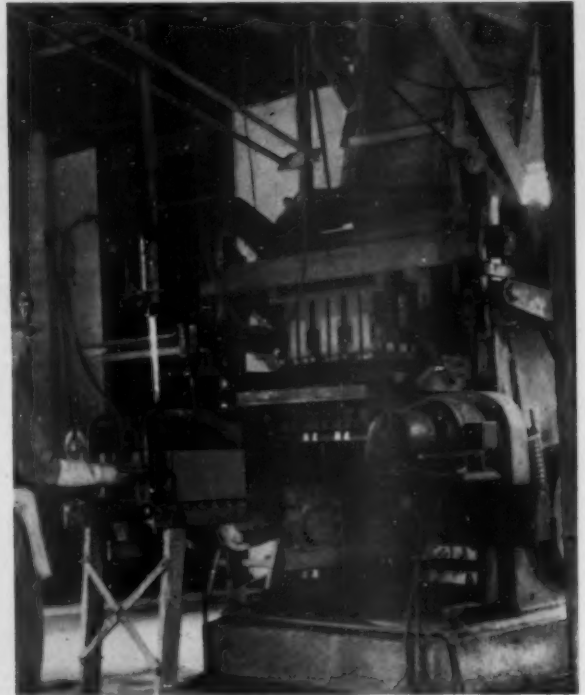
## BESSER MANUFACTURING CO.

208 Forty-Fourth St.

Alpena, Mich.

Complete Equipment for Concrete Products Plants

THE SAVING IN PALLET COST WILL PAY FOR  
A BESSER VIBRAPAC PLAIN PALLET STRIPPER



Left: Mixer with traveling beam scale hopper above for accurately measuring out aggregates. Right: High production block machine equipped with pneumatic off-bearer

(Continued from page 141)

to capitalize further on this tendency of the farmer to benefit by the experience of his neighbor. A direct mail program is under consideration that will take the story of a new block installation to all of the neighboring farmers. Letters will call attention to the improvement and circulars will illustrate it and describe its features. All printed matter will bear a dealer's imprint and be mailed on a cooperative basis to all farm box holders in the dealer's territory. In this way the dealer's relationship to his farm trade will be fully utilized. With protected sales territories this sales promotion effort should be mutually profitable.

#### Block Plant Layout

The Steward and Silver plant is on a 6-acre site located in the northeast section of Columbus, Ohio. Materials are brought in on a railroad siding. Limestone fines, Celocrete, and limestone crushed to  $\frac{1}{4}$ -in. down to  $\frac{1}{8}$ -in. are unloaded to a Columbus track hopper and moved by endless chain belt, driven by a 5-hp. Westinghouse motor, to a Columbus Conveyor Co. bucket elevator, 70 ft. centers, with a 10-hp. Westinghouse motor drive. An 8-in. drain connecting to a city storm sewer keeps the track hopper clear of water.

A manually shifted chute at the top of the bucket elevator places the material in the proper storage silo. The four 120-ton capacity silos were

furnished by Marietta Concrete Corporation. Sacked cement is unloaded from the car to floor trucks and moved directly into a Capital hydraulic elevator and taken to storage space on the second floor. The elevator, capacity 3000 lb., is the automatic push button type.

All mixing is done on the second floor of the plant. Materials are weighed out from the silos in a double Winslow traveling beam scale and dropped into a Besser mixer

driven by a 20-hp. U. S. motor. Water is added by experience in judging the moisture content of the materials. After mixing, the batch goes directly to the Besser super-automatic Vi-brapac set up on the first floor. The block machine is equipped with a pneumatic off-bearing hoist operated from a Curtis air compressor driven by a  $1\frac{1}{2}$ -hp. Century motor. A chain hoist is used in changing stripper heads and mold boxes.

Block are loaded from the block machine to rack cars made by the Chase Manufacturing Co. Each car will take 54 of the standard 8-x 8-x 16-in. block. The cars, having flanged wheels, are pushed to a transfer car and shifted to a track leading into one of the six double-tracked curing rooms which are 80 ft. long and 5 ft. 5 in. high. They have concrete floors, concrete block sidewalls, and there is a reinforced concrete floor above that provides a tight ceiling. Two steam radiators, heated by a low pressure steam boiler, maintain a temperature of 85 deg. After curing, the cars are pushed out of the curing rooms to another transfer car and sidetracked to a yard track where the block are unloaded and stacked.

The yard is level and dry. This was accomplished by hauling in some 2000 truckloads of cinders and spreading to a depth of 2 ft. Rollers leveled the cinders. The result is a dry smooth yard that is not affected by the

(Continued on page 149)



Freight cars with aggregates are dumped into hopper feeding bucket elevator into plant

**NO**

**PALLETS REQUIRED**

**WITH**

**J & C BRICK MACHINES**

**JUST THINK  
WHAT SAVINGS  
THIS MEANS!**

Combined with a manufacturing method that turns out perfect bricks, Jackson & Church brick machines do the job without pallets. Here is a real saving-factor both in your initial investment and in your cost of operation.

**28,000  
PERFECT BRICK  
IN ONE 8-HOUR  
SHIFT . . . . and  
NO PALLETS  
NEEDED**

Smart operators find Jackson & Church units to be highly profitable installations because the machines operate as any other well-designed, smoothly-functioning machine does which turns out a "quality product" on a mass production basis. Type A machine produces up to 28,000 perfect bricks in one eight-hour day and Type C, shown here, turns out up to 14,000 per day.

Bricks made on these units find ready sale because of their even texture, square corners, uniformity, and all-around quality. In addition J & C machines eliminate the need for costly pallets and save considerable labor. The concrete is compressed so firmly that the bricks are removed by hand and piled on top of each other in flat-deck platforms. Either frog-type or solid concrete bricks can be produced.

**BE PREPARED** for the post-war reconstruction period with Jackson & Church brick machines and plant equipment. Write for complete information and prices to . . .

**JACKSON & CHURCH**  
SAGINAW MICHIGAN



### PERFECT BRICK

Pressed in a pocket under 10,000 psi. pressure, each brick is square, true to size and free from warp. Up to 320 bricks can be made from a single sack of cement with strengths as high as 3,700 psi. and absorption as low as 6%. J & C machines produce plain or colored bricks from standard or special lightweight aggregates.

**JACKSON AND CHURCH COMPLETE  
BRICK-MAKING PLANTS**



## Tie In Block with Ready Mix

**J. R. Borgelt utilizes labor more efficiently by adding block to ready mix production for sale to farmers**

**A**DVANTAGES of having a concrete block plant operating along with a ready-mixed concrete plant to provide full coverage in an active market were quickly recognized by J. R. Borgelt of Ottawa, Ohio.

Mr. Borgelt is the lively building materials man who erected a ready-mixed batching plant in a farm community a few years ago. With his new concrete block plant and his building supply business he is prepared to meet all of the building requirements of his prosperous farm trade. Farmers in Ohio received \$698,463,000 for their products in 1943, an increase of 16 percent over the preceding year. A considerable portion of this income is now being spent in making improvements on the farms.

### Block Plant

The new concrete block plant consists of a building 38 ft. wide and 50 ft. long. It has been constructed of concrete block with a frame hip roof covered with roll roofing. It houses a Stearns Clipper stripper and a 7-cu. ft. paddle tilt mixer operated by a 5-hp. geared General Electric motor. Block are made of limestone screenings as aggregates. The paddle mixer is located but a few steps from the stockpile that serves both the ready-mixed concrete plant and the block plant. The man who tends the batching hoppers of the ready-mixed concrete plant can also operate the block machine during slack periods. Two sizes of block, 8- x 8- x 16-in. and 6- x 8- x 16-in., are made and cured in the building. A pot-bellied coal stove is used when needed. Yarding space to the south of the building contains stockpiles of both sizes ready for use.

### Reaches Farm Market with Both Products

By combining a concrete block plant with a ready-mixed concrete set-up, Mr. Borgelt has demonstrated his ability in judging farm trends. He grew up in a lumber and building supply business established by his father. Since he has had active management of the business he has broadened its base by maintaining a large and varied stock of merchandise capable of filling every farm

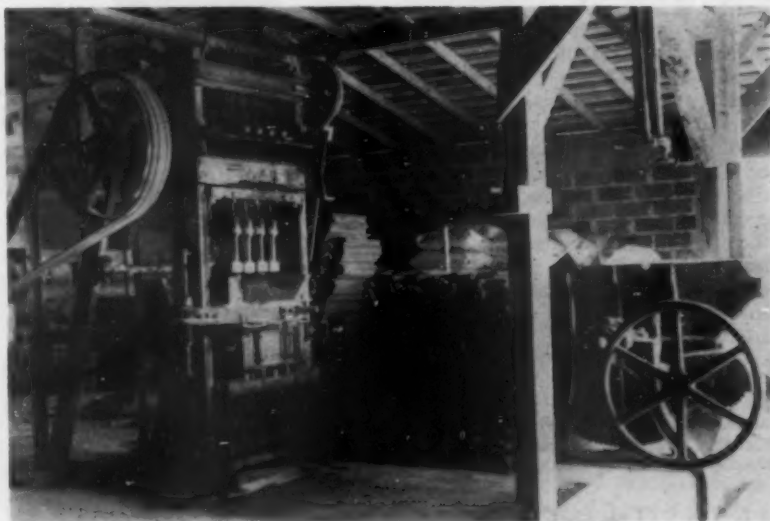
improvement need. With the present wide scope of his operations he is able to extend his services. The extent of the accomplishment can be measured by the number and variety of the jobs he has served. During the past year Mr. Borgelt has supplied the concrete used in paving 57 barnyards in his neighborhood. He has also furnished the concrete that went into 148 feeding floors. He has supplied both block and ready-mixed concrete to repair 35 old barns. These are figures taken from his records.

With a nearby market that needs new barns, hog houses, chicken houses, milk houses, storage houses, sidewalks, well platforms, poured concrete septic tanks, and soil conservation dams in addition to more feeding floors and paved barnyards and which has the steady income to provide for these improvements, Mr. Borgelt is in a position to be of service in his community. It is his opinion that these improvements will be made regardless of the well known

*(Continued on page 149)*



Ready mixed concrete plant, to the left, and new block plant, to the right



Tamper type block machine with mixer shown to the right

# Make 6" to 48" CONCRETE PIPE with ONE Machine

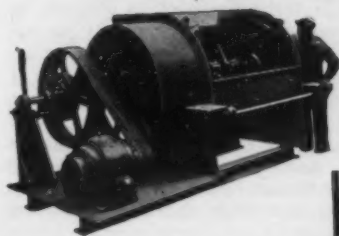
We can equip you to do this now—with Universal's "all-purpose" machine, perfected for our own use in the 26-pipe-making plants we own and operate. We can also equip you for making larger sizes—up to the 135" diameter pipe we have made for highway use. Because we are in the pipe-making business ourselves, our advice, as well as our equipment, is worth getting together, they'll put you in position to produce pipe profitably.

Write for catalog and details.

## UNIVERSAL CONCRETE PIPE CO.

Home Office, 297 S. High St., Columbus 15, Ohio  
26 Plants in Eastern, Central and Southern Locations  
Eastern Sales Division, 1824 Graybar Bldg., N. Y. C.

## The **BIG LEAGUE MIXER** → **MULTI-MIXER**



- 1 Thorough, low-cost mixing.
- 2 New type paddles.
- 3 Reverse action mixing
- 4 Sturdy construction
- 5 Guaranteed to do the job.

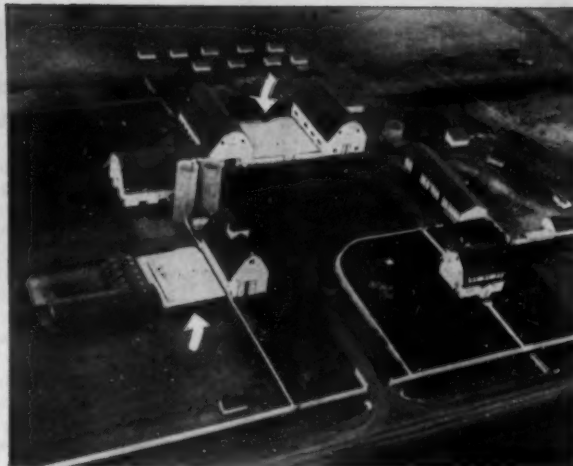
Highly efficient concrete products plants use **MULTI-MIXERS** to get faster and more thorough mixing of every batch. The unique paddle design and reverse screw-type mixing action keep product costs low and product quality high. Another feature of distinction, and one that lends itself to convenience in handling, is the side, and, or bottom discharge.

### A Better Mix at Lower Cost—

Per Batch! Per Yard! Per Day!

Write for booklet describing the **MULTIPLEX** complete line of mixing equipment. Double and Single Hand Press Strippers, Super Tampers and Vibrators.

**MULTIPLEX** CONCRETE  
MACHINERY  
ELMORE, OHIO



## CONCRETE HELPS WAR JOB ON THIS FARM

Plenty of concrete materials are available for improvements which save labor, increase food production and provide additional facilities for storing and preserving foods. Farm structures are recognized as war equipment.

Besides feeding floors and paved barnyards, which save both feed and labor, farms need ratproof poultry houses, concrete dairy barn floors, sanitary milk-houses. Timely concrete repairs can increase the firesafety and usefulness of thousands of farm buildings.

Concrete builders should let farmers know that they can help them make necessary improvements now.

Ask us for samples of inexpensive literature and advertising suggestions you may use with farmers.

## PORTLAND CEMENT ASSOCIATION

Dept. 8-45, 33 W. Grand Ave., Chicago 10, Ill.

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

**BUY MORE WAR BONDS**

## P. C. A. Divides Products Bureau

**Creates new Farm Bureau and changes name of other division to Housing and Cement Products Bureau**

**T**o better serve the large farm market for concrete products, the Portland Cement Association has divided the Cement Products Bureau into two parts, a new division to be known as the Farm Bureau and the Housing and Cement Products Bureau which will do a more concentrated job in developing the market for concrete products for housing and related uses.

W. G. KAISER, who has been manager of the Cement Products Bureau since March, 1933 will be manager of the new Farm Bureau. The new arrangement, according to W. M. Kinney, general manager of the P.C.A., will enable the Association to render greater service to various farm agencies and rural contractors in solving problems encountered in designing and building farm facilities of concrete. Mr. Kaiser is a past president and Fellow of the American Society of Agricultural Engineers, and has a close personal interest in the problems of the farmer as he is the owner of farm land and spent his early years on a farm before he went to college. He also is chairman of Committee 700, Shop Manufacture, American Concrete Institute, and a member of Committee 714, Recommended Practice for the Construction of Concrete Silos. Mr. Kaiser is second vice-chairman of A.S.T.M. Committee C-15 on Manufacture of Masonry units, and a member of Subcommittee on Research, Committee C-12.

In his new work Mr. Kaiser will be assisted by E. L. Hansen, agricultural engineer of the Portland Cement Association.

### Farm Market Promotion

For years the Portland Cement Association has been actively cultivating the good-will of farmers, building supply dealers reaching the

rural market, agricultural agents agricultural colleges, and other farming groups. A great deal of literature and farm building plans have been prepared and distributed, but the present set-up will serve to intensify the farm promotion program. Typical of this promotional literature which recently has been prepared is the bulletin, "A Plan to Help You Merchandise Concrete Masonry in the Farm Market." This bulletin which graphically portrays the immense farm market is designed for distribution to concrete products manufacturers to show how the farm market can be profitably cultivated by mail, newspaper ads and building plans. Typical advertising used by successful producers is illustrated. The bulletin points out that for properly housing dairy cattle, 125 block per cow are required; for 10 hens,



John A. Ruhling



W. G. Kaiser

80 block are needed; and for one sow, 136 block are required. Along with this bulletin, a Sales Kit has been prepared showing plans of various farm buildings, material requirements, and costs.

### Housing and Cement Products Bureau

JOHN A. RUHLING, formerly assistant to Mr. Kaiser, will be manager of the newly named Housing and Cement Products Bureau. Mr. Ruhling is widely known to concrete products men throughout the industry. For a number of years before he became assistant to Mr. Kaiser, Mr. Ruhling represented the P.C.A. in the Fox River Valley with headquarters at Appleton, Wis. This change will enable the Association to broaden its service to concrete products manufacturers and urban contractors concerned with housing and the use of concrete for a wide range of home and industrial improvements. Mr. Ruhling is chairman of Committee 708, Recommended Practice for the Manufacture of Concrete Masonry Units, American Concrete Institute.

### CHORUS GIRLS and POLICEMEN

**Will NOT Be Interested!**

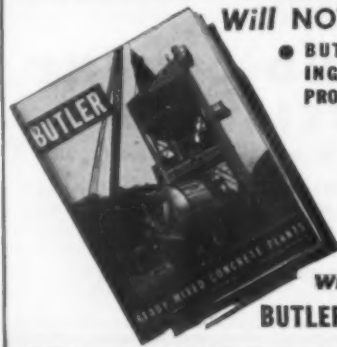
• BUT IF YOU ARE THINKING IN TERMS OF HIGH PRODUCTION, LABOR SAVING

**READY MIXED CONCRETE PLANTS**  
Engineered to meet Your Requirements

**YOU WILL WANT THIS 44 PAGE PROFUSELY ILLUSTRATED BOOK**

Write for Bulletin P-185

**BUTLER BIN CO. WAUKESHA WISCONSIN**

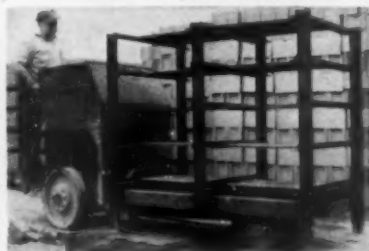


### YOU SPECIFY-WE FURNISH Better Johnston Steel Racks and Pallets . . .

are built on order to suit your needs. They are the most economical and efficient that can be made for your plant requirements. Johnston racks and pallets are already giving complete satisfaction in numerous plants. Let us handle your requirements.

**JOHNSTON IRON WORKS**

1133 Cornelia Ave.  
Chicago 13, Illinois





## Sell Country Dealers

(Continued from page 144)

weight of the stockpiles.

A Unit sack cleaner, driven by a 1½-hp. General Electric motor, recovers one sack of cement in every 2000 cement sacks clean.

Steward and Silver make block in three sizes, 4- x 8- x 16-in., 8- x 8- x 16-in. and 12- x 8- x 16-in. Bull-nose corners are also made in these sizes. Solid block are made in 4- x 8- x 16-in. size. Tamped lintels are also made in the plant.

The firm has been a continuing partnership since 1910, and both partners, W. R. Steward and D. G. Silver, are active in the business. The present plant, built entirely of concrete products, was erected in 1941 and marks the expansion of a business identified solely with the manufacture of concrete products for many years. Plans are under way to erect an office structure on one corner of the yard. The building will have offices on the first floor and a five-room apartment on the second floor, to be occupied by the plant superintendent. The structure is being designed, complete with front porch, doors and windows, so that it will take on the general appearance of other duplexes in the residential neighborhood. The building will, of course, be built of concrete block.

## Tie in Block and Ready Mixed Concrete

(Continued from page 146)

farm labor shortage. He says that when a farmer wants to build something and needs help, he calls in all his neighbors. The farmers come together and help one another. That is a fact worth remembering in considering the possibilities of the farm market.

The ready-mixed concrete batching plant was described in ROCK PRODUCTS, June, 1942, p. 66. It consists of a Heltzel bin and batcher with a truck-unloading hopper and a Columbus chain bucket elevator. Mixing is done in a 2-cu. yd. Jaeger high-dump transit mixer, mounted on a light truck chassis. Mr. Borgelt has ordered a second 2-cu. yd. Jaeger mixer on an International K-7 chassis.

## Large Pipe Orders

GRAYSTONE CONCRETE PRODUCTS CO., Seattle, Wash., recently received orders for over 70,000 lineal feet of concrete sewer and culvert pipe. The Valley Construction Co., awarded a contract for pipe to be used in Seattle. Over 50,000 ft. of pipe will be installed in sizes from 8-in. to 42-in. diameter. The Sound-Kiewit Co., awarded Graystone contracts to furnish approximately 20,000 lineal feet of reinforced concrete culvert pipe for units 2 and 3 of the Bremerton-Shelton Railroad. Sizes will range

from 12 in. to 72 in., inside diameter. Most of the pipe will be made in the Graystone plant in Seattle, and the balance will be manufactured by the Bremerton Concrete Products Co.

## Permeability of Concrete to Kerosine

INCREASED wartime use of concrete tanks for storing Diesel oils, light fuel oils, and gasoline induced the National Bureau of Standards to undertake a limited investigation of methods for rendering concrete adequately impermeable to these products. Measurements were made by F. B. Hornbrook of the daily inflow of kerosine under a 12-ft. pressure head into one face of specially treated concrete disks.

The penetration of kerosine into 14-day-old untreated concrete was relatively low but after the concrete dried for 6 weeks the penetration was high. The use of integral admixtures and of lacquered instead of oiled forms reduced the penetration, but not enough to be economically adequate. Sodium silicate or magnesium fluosilicate applications were not significantly effective; but plain, well-trowelled plaster coat of cement-sand mortar reduced the rate of penetration of the kerosine to a low value. Whether the development of shrinkage cracks on a large surface treated in this manner would nullify these results remains a question. Powdered iron-type admixtures in the mortar coat did not reduce oil penetration; whereas one magnesium oxychloride type of coating looked promising if used where exposure to drying or to water is not excessive. This type of coating has the advantages of low cost and easy application. Spar varnish was effective in reducing penetration but would require long time tests to indicate its permanence to such exposures. Polyvinyl chloride type paints and polysulfide emulsified latex linings were effective and are reasonably stable to water, oils, and gasoline. However, these materials are expensive and the cost of applying them is high, so that their use is warranted only under special conditions.

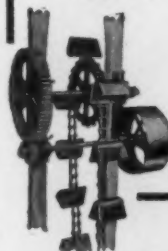
## Build Ready Mix Unit

THE JOPLIN CEMENT CO., Joplin, Mo., is planning immediate construction of a ready mixed concrete plant on its property on the northwest corner of Tenth street and Moffet avenue.

## Contract for Large Pipe

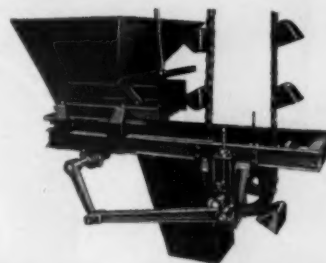
THE AMERICAN PIPE & CONSTRUCTION CO., Los Angeles, Calif., has been awarded the contract to manufacture and install 12,290 ft. of 52-in. lock-joint, steel-cylinder concrete pipe for the Green river supply line for \$279,816 by the Tacoma, Wash., Board of Contracts and Awards.

## KENT --- Aggregate Elevators



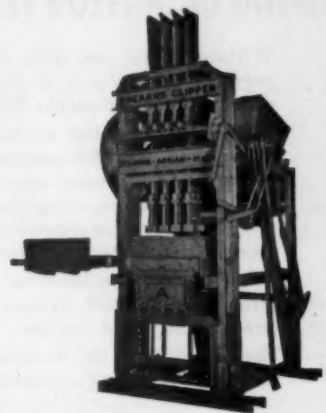
for  
**EFFICIENT  
MATERIAL  
HANDLING**

**KENT TOP DRIVE**



**The KENT ELEVATOR FEEDER**  
Regulated constant automatic feed from hopper to elevator buckets.

**The KENT MACHINE CO.**  
CUYAHOGA FALLS, OHIO



## "ANCHOR"

Complete equipment for making concrete, cinder and other light weight aggregate units, including engineering service for plants and revamping of old ones for more economical service. Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers, Stearns Joltcrete, Stearns mixers, pallets, Straublox Oscillating attachments, etc.

Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

**Anchor Concrete Mch. Co.**

G. M. Friel, Mgr.

Columbus 8, O.



**WATER BOY  
1944 Model**

## 20 FEET OR HUNDREDS OF MILES . . . YOU CAN DEPEND ON NAYLOR LIGHT-WEIGHT PIPE TO DELIVER

Whether your job calls for water or de-watering . . . high pressure or low . . . it will pay you to check the advantages of Naylor Light-weight Pipe.

This pipe with the exclusive Lockseam Spiralweld structure provides dependable performance not found in any other light-weight pipe. Greater strength that enables Naylor to handle jobs normally requiring heavier-wall pipe. Leaktightness. Safety—through its "continuous expansion joint" construction that absorbs shock loads, stresses and strains.

Along with these benefits, Naylor gives you greater speed of assembly, cuts work, lowers maintenance and effects other economies right down the line.

Sizes from 4" to 30" in diameter—thickness from 14 to 8 gauge. All types of fittings, connections and fabrication.

### Use NAYLOR PIPE for

Dredging • Hydraulic Sluicing • De-Watering • Ventilating • Exhaust and Intake • Gas Gathering • Pulp Lines • Vacuum Lines and other high or low pressure lines.

*Naylor*

**LOCKSEAM  
SPIRALWELD PIPE**

### NAYLOR PIPE COMPANY

1237 EAST 92nd STREET, CHICAGO 19, ILL.

New York Office:

350 Madison Ave., New York 17, N. Y.

## Aluminum Dust Silicosis Treatment

SOME INTERESTING RESULTS have been reported in the *Canadian Medical Association Journal* concerning the use of aluminum dust as an inhalant in the treatment of silicosis. While not a substitute for dust control programs, the new treatment appears to have both preventive and therapeutic values.

In 1932, McIntyre Research, Ltd., began experiments with preventives and treatments for silicosis, the pulmonary disease which sometimes afflicts workers who have to breathe heavy concentrations of silica dust over long periods of time. After discovering what promised to be a fruitful new line of experiment in 1939, McIntyre Research started intensive testing among employees of its gold mine in Timmins, Ontario. In a recent report in the *Canadian Medical Association Journal*, the scientists were able to state that their treatment "would appear to be followed by beneficial results in a significant proportion of cases."

The McIntyre treatment consists of simple inhalation of aluminum powder. The granules used are produced by pounding small pieces of thin aluminum sheets into a fine dust, a process devised at the Pittsburgh plant of the Aluminum Company of America. When inhaled, this powder reacts on the silica particles, coating them with a thin gelatinous film and inhibiting their serious effect on the human organism.

The experiments at McIntyre began with 41 men, of whom 34 went through the complete treatment. Subjects started with a five minute inhalation of the aluminum powder, stepped up the dosage to 30 minutes, and continued the treatment over a period of almost a year in some cases. At the end of that period, 19 of the 34 men showed clinical improvement. Disappearing or appreciably lessening were shortness of breath, coughing, chest pains, and fatigue. The other 15 cases showed neither improvement nor deterioration. But doctors considered this notable because the men involved had continued their exposure to silica dust. Other men under observation who were untreated by aluminum therapy showed progression of their silicosis in six of nine cases.

Larger testing was then undertaken at Washington, Penn., where subjects came from brick-making and refractory plants, foundries, rock quarries, and sand-blasting jobs. An initial group of 33 diseased subjects who had been exposed to concentrations of 17% to 97% free silica all showed improvement in 135 of the serious cases, with six unchanged and two getting worse. Comparable beneficial effects followed the treatment in the less serious cases.

## SPECIFICATIONS

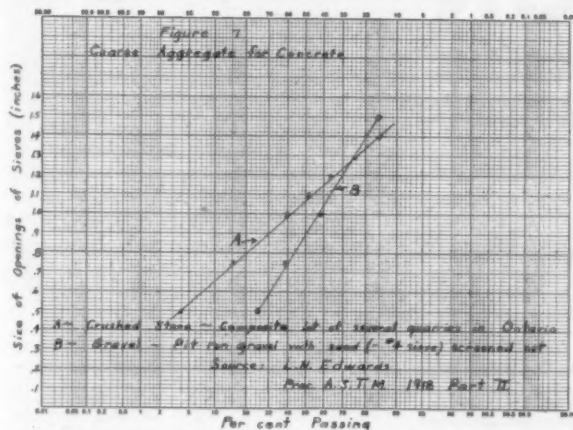


Fig. 7: Aggregate gradings of crushed stone and of gravel for concrete

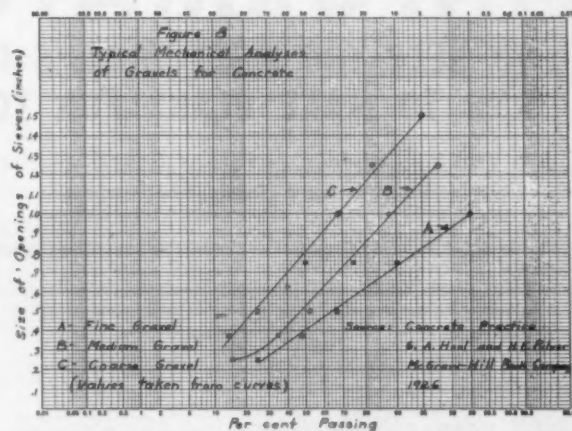


Fig. 8: Values of typical mechanical analyses of gravels for portland cement concrete

### Aggregate Specifications

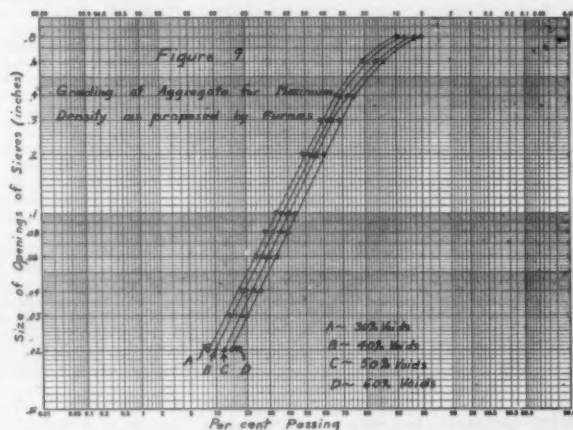
(Continued from page 66)

coarse aggregate and the degree of fineness or coarseness and therefore the slope, is involved in the consideration of the type of traffic to be carried by the pavement, and in the determination of the amount of binder to admix with the aggregate.

Hveem and Stanton<sup>8</sup> have developed the grading curves shown in Fig. 5 for aggregates satisfactory for the construction of low-cost bituminous pavements. They studied the results of gradings for Portland cement concrete, asphaltic concrete and other construction, not only in California, but as reported from various sources throughout the country. The grading tolerances shown in Fig. 5 represent a composite of the grading systems which have been developed under numerous conditions. Stanton and Hveem have placed notes in certain areas on the figure as a general guide for recognizing probable characteristics of gradings where the plotted curves transgress these areas. These grading limits form the types of probability curves shown in Fig. 6, the straight line portions of which include approximately 70 percent of the aggregate. It is an inherent characteristic of the grading lines to deviate from a straight line for the larger sizes. It will be found that if the aggregate are made to grade into the region of aggregates most costly to produce and surface easy to finish that a straight line is obtained for a higher percentage of the aggregate. On the other hand, large size aggregate (gravel particles) do not follow the logarithmic-probability relation.

Referring to large sized aggregate, typical analyses of coarse aggregate

Fig. 9: Curves which show that the distribution of material finer than 0.5 in. in diameter tend to follow a straight line, and increasing voids tends to alter position of the curve without materially changing slope



for portland cement concrete reveals that coarse material, instead of following the logarithmic-probability function, tends to follow an arithmetic-probability function. In Fig. 7, aggregate gradings of crushed stone and of gravel are plotted from data published by L. N. Edwards<sup>9</sup>; and in Fig. 8, other values of typical mechanical analyses of gravels for portland cement concrete are plotted. The graphs referred to indicate that:

- aggregates of sand sizes of suitable grading tend to follow a logarithmic-probability relation.
- aggregates of gravel sizes of suitable grading tend to follow an arithmetic-probability relation.

Furnas<sup>10</sup> has calculated the grading of continuously graded aggregate for

production of maximum density for the size range 1-in. to No. 65 mesh to illustrate a general method of calculation. The determinations were made for mixtures having 30, 40, 50, and 60 percent voids.

The data below are plotted in Fig. 9. These curves show that the distribution of the material finer than 0.5-in. in diameter tends to follow a straight line, and that increasing the voids tends to alter the position of the curve without materially changing the slope of the curve (for maximum density in all cases). According to the theory of Furnas, the determination of the grading for maximum density depends on (a) the shape of the particles, on which depends the percent of voids, and (b) the limiting size ratio of the system, that is the

(Continued on page 159)

Sieve Size (inches) . . .	.02	.04	.06	.08	.10	.20	.40	.60	.80
30 percent voids . . . . .	8	18	24	28	33	48	66	79	90
40 percent voids . . . . .	10	20	27	32	36	51	68	81	92
50 percent voids . . . . .	12	23	30	36	39	56	73	84	94
60 percent voids . . . . .	14	26	34	39	44	59	76	86	95



# INFORMATION

## TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

You can obtain catalogs listed on these pages by  
merely checking and mailing the coupon below.

**1 BELT CONVEYORS**—Continental Gin Co. has released Engineering Data Book ID-105 on belt conveyors and idlers which contains engineering information, tables and suggestions in design that will enable engineers to select conveyors of the proper size, speed, power, etc.

**2 BELT CONVEYOR EQUIPMENT**—Webster Mfg. Co., Inc., 180-page illustrated Catalog 60-B describes belt conveyor equipment. Included are engineering tables, statistical data, information on belt conveyors, idlers, trippers, and accessories for complete system.

**3 BLOCK MACHINES**—Stearns Mfg. Co. has issued a 4-page booklet describing and illustrating Models A, C, and E block machines, also attachments for these machines. A cross-section diagram of a typical installation is included.

**4 CEMENT PLANTS**—The C. S. Johnson Co. has published a 4-page bulletin describing and illustrating complete bulk cement plants and cement handling equipment such as bucket type elevators, box car receiving hopper and adjustable angle track screw, also bins and silos.

**5 CONTROLLERS**—The Bristol Co. has announced a new bulletin No. B-220 describing its new line of Free-Vane electronic controllers for automatically controlling temperature, pressure, liquid level, and humidity. The bulletin gives wiring diagrams, principle of operation and general description and features of the new instruments.

**6 CONVEYORS**—Robinson Air-Activated Conveyor Systems has issued Bulletin 310 describing and illustrating the air-activated conveyor system that can handle materials varying in weight from 10- to 100-lb. per cu.ft. and in fineness from 40- to 500-mesh. A schematic ar-

rangement of the unit and a list of installations made since 1935 are also included.

**7 CRUSHERS**—Nordberg Mfg. Co. has issued a new booklet on the care of Symons cone crushers, Bulletin 116, listing some of the more common problems or faults encountered in crusher operation and the methods to be used in correcting them.

**8 DRILLS**—Independent Pneumatic Tool Co. has published an interesting brochure covering the history, development, features and specifications of the recently introduced Thor plastic-housed portable electric drill. It demonstrates the growing use of plastics for many industrial purposes.

**9 DRIVES**—Chain Belt Co. has issued a booklet "Wartime Care of Chain Belt Drives," Bulletin No. 435, giving information on maintenance, lubrication and repair of chain belt drives.

**10 DUMP TRUCKS**—The Euclid Road Machinery Co. has released a new handy "pocket size" Operator's Handbook, giving suggestions and instructions for the proper care and efficient operation of bottom-dump and rear-dump trucks. Also included are lubrication charts and schedules, air charts, and helpful hints.

**11 MIXERS**—Stearns Mfg. Co. has released a 4-page booklet describing and illustrating concrete mixers. Specifications and other information are also included.

**12 IDLERS**—Link-Belt Co. new 16-page Book No. 1915 describes and illustrates the new "100" anti-friction idler for belt conveyors and gives detailed information on the various sizes available in the several types, including troughed carrying-

run, flat-roll carrying and return, troughed self-aligning, and self-aligning return idlers. Dimensions, weights and list prices are also given.

**13 LOADING GATES**—The C. O. Bartlett & Snow Co. has brought out a 4-page engineering bulletin (No. 92) describing and illustrating the new plug feed type skip hoist loading gates. The folder contains detailed engineering diagrams and a table giving the dimensions of 11 standard sizes.

**14 RECLAIMERS**—Youngstown-Miller Co. has released Bulletin YM-600 describing and illustrating lubricating and hydraulic oil reclaimers with capacities ranging from 2½ to 90 gal. in 70 to 90 min., which are recommended for restoring all types of used oils.

**15 PYROMETERS**—Leeds & Northrup Co. has issued a 48-page Catalog N-33B describing and illustrating the new Rayotube equipment for measuring temperatures, entitled "Micromax and Speedomax Rayotube Pyrometers." It also includes equipment used to measure temperature of molten cast iron, electric salt pots and blast furnace stove domes.

**16 RELAYS**—General Electric Co. has released Bulletin GEA-4214, describing and illustrating CR7511-A electronic relay consisting of a standard electronic tube, a supply transformer and an electromagnetic relay which can be used as a liquid-level control, stop switch, and to detect water in gasoline tanks. It can also be used for sorting small parts and for maintaining constant temperature in a process. Diagrams of the various applications are also given.

**17 SYNTHETIC RUBBER**—New York Belt-ing & Packing Co., has released a booklet entitled, "Facts About Synthetic Rubber," which gives an over-all picture of the history of synthetic rubber and some fundamental facts about its production. The booklet covers the five general commercial types (Buna S, Buna N, Neoprene, Butyl and Thiokol) and explains the characteristics which make each type adaptable to specific services.

**18 SCALES**—The Howe Scale Co., has published a folder (No. 501) illustrating and describing scales for every weighing purpose.

**19 TRUCKS**—Industrial Handling Equipment Co. has published a six-page edition (second section) of a new industrial handling equipment catalog, describing and illustrating new model automatic dump hoppers mounted on casters, Heavy Duty (wagon type) trucks, Specific Purpose trucks, truck trailers, etc.

**20 V-BELTS**—Allis-Chalmers Mfg. Co. has released a new bulletin, No. B-6331, describing and illustrating five special types of Texrope V-belts. The new type Magic-Grip sheave and the four speed changing methods used are also described in the bulletin.

**21 WELDING**—American Manganese Steel Division of the American Brake Shoe Co. has issued an informative, well-illustrated bulletin No. 344-W, titled "Conservation Welding" giving helpful suggestions on welding operations.

**22 WIRE ROPE**—Broderick & Bascom Rope Co. has released a new pocket edition of their "Riggers' Hand Book" for users of wire rope. The book consists mostly of pictures and practical tables for convenience in obtaining helpful information.

**23 WIRE ROPE SLINGS**—John A. Roebling's Sons Co. has issued a 72-page catalog showing various types of slings. The catalog gives data on wire rope and grommet slings for both standard and special uses, also the "Flatweave" sling.

*Cut Out and Mail This Coupon to*

**ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago, Ill.**

I would like to have the items circled.

(8-44)

1	2	3	4	5	6	7	8
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Are you giving any thought to the Cranes, Shovels and Draglines that you will be needing for the future? It is none too soon to start taking stock of your excavator and material handling requirements. Tomorrow's highly competitive markets will call for maximum economies. If your present equipment is not capable of meeting that demand, do something about it, now! We suggest that you write us today or contact the nearest Lima dealer for complete information on sizes, types and features of LIMA excavating and material handling equipment—the equipment that will help you do a better job faster at lower cost.

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SHOVELS  
3/4 YD. TO 5 YDS.  
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CRANES  
13 TONS TO 100 TONS  
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## SODA ASH FLOWS EASILY NOW!

• Midwestern cement plant had difficulty keeping free flow of soda ash from bins—until it installed "Branford" Pneumatic Vibrators. Installation view below. There are six "Branfords" in this plant.

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PNEUMATIC  
VIBRATORS**



• Keep material handling equipment operating at peak capacities and labor costs down to a minimum by using "BRANFORD" Pneumatic Vibrators on Hoppers, Bins, Chutes, Screens, Concrete Buckets, etc.

Economical in operation and maintenance.  
Flow of material regulated by air control valve.  
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## GRUENDLER CRAFTSMANSHIP *Serving Industry over 50 Years*

Continuous Peak Production  
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Depends Largely on  
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**GRUENDLER  
CRUSHERS and  
PULVERIZERS**

of heavy duty types with  
capacities to 300 tons  
per hour—produce uni-  
form lime dust to exact  
specifications.



Cut-away View of Hammer Crusher  
Mfrs. of Double Roll Crushers and Hammer Crushers for Secondary Crushing requirements.  
BULLETIN on large capacity HAMMER-MILLS mailed on request

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**CRUSHER and PULVERIZER CO.**  
2915-17 North Market St., ST. LOUIS (6), MO.

## Better Instrument Care Pays Dividends

(Continued from page 118)

inspected for mechanical and electrical balance. Some of the most prevalent maintenance problems in connection with this equipment installed in rock products industry, are due to dust laden atmosphere. Lubrication picks up the dust and forms an abrasive destructive to the mechanism. Special attention should therefore be given to lubricated bearing surfaces where dust might settle and lodge. Frequent cleaning and relubricating will eliminate to a great extent any difficulties of this nature. If the instruments are protected with dust proof cases or installed in a manner discussed later in this arti-

cle infiltration of dust laden atmospheres can be avoided.

Electronic potentiometers, in general, and due to design and construction, are well suited to withstand the dust laden atmosphere experienced in the industry. They have fewer wearing parts and maintenance is cut to a minimum. If instruments of the electric controlling type are in operation, care should be taken to inspect the switch contacts from time to time. In the case of open contacts, these should be cleaned in accordance with the manufacturer's recommendations.

### Favor Air-Operated Controls

Wherever possible, glass enclosed mercury switches should be specified, as they are free of the troubles encountered with open-type contacts.

There is a decided tendency on the part of the industry to favor the use of air-operated control equipment since the maintenance of open contacts and other electric appliances is eliminated. In this case, it is relatively easy to insure that clean dry air is supplied to the instrument and auxiliary equipment. This is accomplished by installing proper conditioning equipment recommended and supplied by the manufacturer. A periodic inspection of filters and drip-wells should be established. Special attention also should be given where air-operated pistons or cylinders are used for operating dampers and louvers. A dust-tight protective stocking or sleeve should cover the piston shaft to prevent scoring by abrasive dust, thus eliminating bearing difficulties and air leaks.

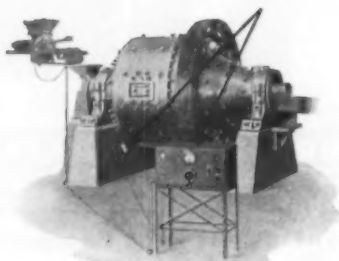
The lubricants and methods of cleaning as recommended by the manufacturer have been specified after carefully study. Therefore, the instrument user should follow these instructions to the letter in order to secure the greatest benefit from his instruments. Don't just grab the nearest oil can and piece of waste.

In general where the atmosphere surrounding the furnace or kiln is laden with dust or corrosive gases, it is to the user's advantage to place the instrument in a location where the atmosphere is free of such conditions. Additional protecting cases for the instruments and the piping of low pressure air line to the case to provide a positive pressure does much to avoid infiltration of dust or gaseous atmosphere. An arrangement and mounting of instruments as described below should be given careful consideration.

Fig. 1, page 118, shows a control panel or cubicle for two kilns arranged so that the instruments on the interior, which is under a positive pressure to exclude all dust, are visible through the windows in the operating panel. The interior view shows recording and control instruments for each kiln, consisting of recorder for kiln temperature, kiln speed and feeder speed; recorder for kiln exit and boiler entrance; indicating automatic control of kiln pressure, recording control of air volume, indicating control of primary air temperature.

A panel for three kilns and a central fuel conditioning system is shown in Fig. 2. Each kiln is equipped with an automatic recording control of fuel oil flow; indicating control of kiln pressure; record of exit housing and preheated air temperatures; record of draft in firing hood and exit housing; and various manual stations, counters, signal lights, etc. The panel section common to all kilns includes records of oil pressure and temperature, indication of steam pressure and oil suction. In addition to a clock and control stations, a desk and drawer for operating records are provided.

## "Electric Ear" Increases Mill Capacity



An "Electric Ear" sound control unit was installed on an 87 x 26 compartment mill, driven by a 600 hp. motor, in one of Medusa Portland Cement Co. Pennsylvania plants.

This mill was operated in open circuit in 1937 and the fineness varied 4%. After installing the "Electric Ear," the variation fineness was reduced to 1% with a 7% increase in capacity.

In 1939 this mill was closed circuited with a 16 foot mechanical air classifier. Without the "Electric Ear" the capacity was 65 bbls. per hour. With the "Electric Ear" the capacity was increased to 70 bbls. with no change in fineness.

Write for Bulletin 42

# HARDINGE

COMPANY INCORPORATED, YORK, PENNA.

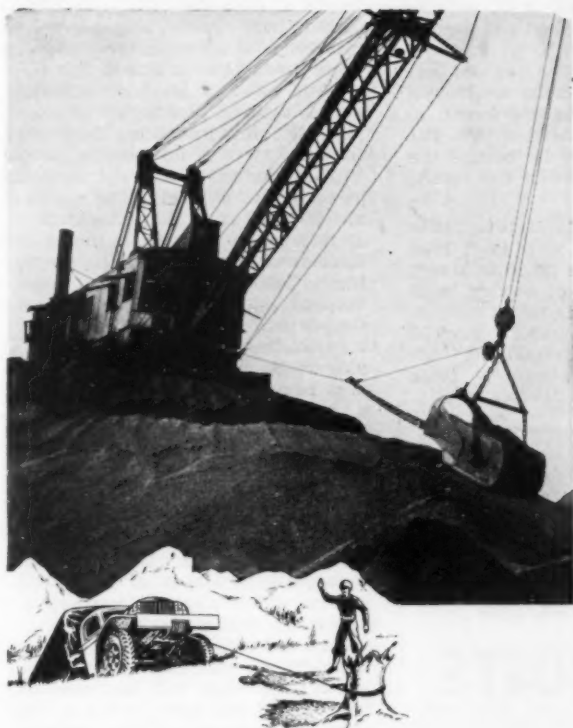
NEW YORK

CHICAGO

SAN FRANCISCO

TORONTO





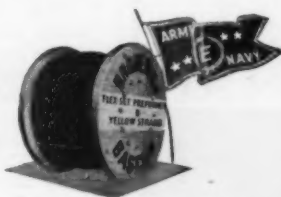
## Make wire rope last . . . keep it on the job

Sharing your wire rope with the armed forces doesn't mean going without; it just means taking care of what you have. For example, inspect it often. Lubricate when indicated. Operate at capacity, but don't overload.

When you must replace a rope, get *Preformed Yellow Strand* for heavy-duty quarry jobs. It's strong, flexible, highly resistant to kinking and fatigue—qualities that result in long rope life. Specify *Preformed Yellow Strand* for hoist and drag lines on your dragline machine . . . for holding and closing lines on clam shells . . . for hoist and swing lines and as rack and crowd ropes on power shovels. B & B engineers will gladly help you choose the right rope and use it right.

**Broderick & Bascom Rope Co., St. Louis**  
Branches: New York, Chicago, Houston, Portland, Seattle  
Factories: St. Louis, Seattle, Peoria

# YELLOW STRAND



PREFORMED WIRE ROPE



## For NON-STOP PRODUCTION

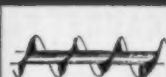
### Rely on Jeffrey for Plans and Maintenance Parts

Keeping production moving without a break is more important now than ever. Fast-moving production lines require dependable and sturdy equipment . . . the kind that Jeffrey builds.

Jeffrey not only furnishes the right maintenance items such as idlers, chains, elevator buckets, apron and spiral flights, sprockets and transmission machinery . . . but also can supply

technicians and engineers to help you coordinate your material handling requirements into a smooth-running system.

The variety of use for Jeffrey conveyors, bucket elevators, feeders, screens, crushers and vibrating equipment is almost limitless. For good parts, for rapid delivery of all kinds of material, for a well-organized handling system—think of Jeffrey first.



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**THE JEFFREY MANUFACTURING COMPANY**

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## Calcination Control

(Continued from page 72)

must be applied by a considerable mass of preheated gases, then uniform temperature of proper elevation may be expected to prevail throughout the finishing zone.

As the lime from the hot zone retains all of its sensible heat, which is used to calcine the core, the finishing duct supplies only what more is needed to maintain the desirable temperature in the finishing zone. The great mass of air still comes from the cooler and is fully preheated by the lime, if not, the additional heat is obtained from the finishing duct.

The finishing zone is of definite dimensions so that lime stays therein a definite time which, in kiln designing, can be varied, as for example: for three-fourths calcination in the hot zone and one-fourth in the finishing zone, more or less. The softer the lime is to be burned the more work is assigned to the finishing zone.

The whole constitutes progressive multi-level burning with each level adjusted to what the lime can stand. When it is capable of cooling itself through rapid dissociation of carbonate, higher temperatures are allowed to prevail, but the remaining carbonate becomes insulated by thick

layers of lime and incapable of absorbing heat rapidly, and it is passed into zones of lower temperature and there given time to finish.

With all this another important gain is secured. Due to higher excess air in the mixture coming down from the finishing zone duct mixed further with air coming from the cooler, the gases in the finishing zone are very low in  $\text{CO}_2$ . Low  $\text{CO}_2$  concentration, as referred to calcination, means the same as vacuum. As kilns go, the finishing zone is calcined in a  $\text{CO}_2$  vacuum and so at a much lower temperature.

Other finishing zones and soaking pits which rely entirely on sensible heat have, by force of circumstances, a high  $\text{CO}_2$  concentration, which tends to lower the calcination rate at any given temperature. In addition, there is danger of recarbonation, i.e., reabsorption of  $\text{CO}_2$ , since if temperature drops the least bit at this temperature level, the oxide can take on  $\text{CO}_2$  even faster than the carbonate can pass it off, all depending on which way the temperature directs the process.

This finishing zone can be established in several different ways, of which only one will be here described, but all need to follow this same principle. Fig. 5, the composite view, also shows this finishing zone arrangement and Fig. 1-B the isotherms prevailing therein.

The zone below the calcining, or hot zone, is called the cooler. This cooler can be divided into two sections, the cooler proper where air may be preheated and lime cooled, and next above and adjacent to the calcining zone; the finishing zone, wherein the lime will be first cooled from the hot zone temperature, whatever that may be, down to 1650 deg. F., and then maintained at that temperature, or slightly above, for whatever time it may prove desirable. The 1650 deg. F. temperature is selected as at that temperature there can be no recarbonation even in center of lime pieces wherein a high  $\text{CO}_2$  concentration may prevail.

For this purpose, the center burner in its simplest form (Fig. 5) would have two ducts with many lateral openings. The upper duct delivers the main volume of combustible as such and distributes it across the shaft to burn in the kiln proper and heat the hot zone. This heat is controlled by previous injection into the combustible of suitable amounts of hot recirculating gas secured, as previously described, from the upper cooler levels of the dissociation zone.

The second, or lower duct, has also many lateral openings which are self-cleaning, that is, the whole is arranged in a special manner to avoid clogging of the openings with lime. This duct receives a certain small amount of combustible and a considerable amount of air premixed so that combustion takes place within the duct. This condition gives as



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USUAL PREMIUM BECAUSE FINE  
PERFORMANCE LEADS TO  
EXTREME MAINTENANCE COST-  
REDUCTIONS.**

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AFFECTING REAL SAVINGS  
NOW AND FOR THE FUTURE?  
GET IN TOUCH WITH . . .**



**KENSINGTON STEEL CO.**  
507 KENSINGTON AVE. CHICAGO 28, ILL.

products of combustion a mixture relatively low in temperature, low in CO<sub>2</sub>, and high in excess air, and this is drawn into the kiln below the finishing zone. Due to relatively large volume, it distributes itself well and mixes immediately with the pre-heated stream of air coming up through the lime from the cooler.

Therefore, when this type of finishing zone is employed, lime will not only contain less core but also less residual CO<sub>2</sub> distributed through the mass, a CO<sub>2</sub> which appears from recarbonation. For best lime, temperatures of lime must be low through the whole process, but as long as there is any CO<sub>2</sub> present, never so low that the reverse reaction could take place.

### Correction—Preparing Sand for Correct Processing

IN THE ARTICLE in the June issue on "Sand Recovery—Preparing for Correct Processing" is an error which probably was apparent to the initiated, but should be corrected for the record. On page 122, in explaining the fineness modulus of the specification limits it reads "2.32, which is too coarse a material" and "3.21, which is too fine a material." Fineness modulus rises with the coarseness of the product. The fineness modulus of coarse aggregate is al-

ways greater than the fineness modulus of fine aggregate. Hence 2.32 is "too fine" not too coarse to fit the specification, and 3.21 is too coarse, not too fine.

The testing sieve standards referred to on page 121 (June issue) as Nos. 4, 8, 14, 28, 48 and 100 and Nos. 4, 8, 16, 30, 50 and 100 are identical, as to size of mesh. The first is known as the Tyler standard and the second as the U. S. standard. Also, it should be stated again, although it stated in the article in June, that plotted on squared cross-section paper, as in Fig. 1, the scale as related to sieve sizes is in logarithmic proportions. However, this distinction is not important for the purposes of discussion in this or subsequent articles.

This series of articles is interrupted in the present August issue for want of space, but will continue in the September or October issue.

NATHAN C. ROCKWOOD

### 10 Million New Homes

IN A RECENT ADDRESS before the New York State League of Savings and Loan Association, Melvin H. Baker, president of National Gypsum Co., expressed the belief that building will provide the nation's post-war economic impetus again just as it did in the 20's. There will be a gradual increase from about 500,000 building units in the first peace year, he said, to a higher level that will

amount to at least 10,000,000 new homes within the first ten years following peace.

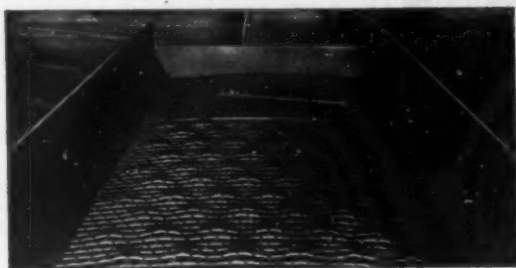
Turning to his own company's products which will be available to meet the demand for building materials, Mr. Baker said, "We now have in production weather protected sheathing made from fire-proof gypsum, a vapor-proof mineral wool that will fireproof and insulate walls and roofs at low cost, a crack-resisting base for plaster and a low-cost washable paint that will make sanitary and colorful interiors. These are not new; the pre-war product has simply been improved under pressure of mass production for military use."

### Need More Fertilizers

WAR FOOD ADMINISTRATION is seeking to increase fertilizer supplies for the 1944-45 season. The latest report dealt with potash, superphosphate and nitrogen fertilizer supplies. For potash WFA is attempting to boost the supply for 1944-45 to 725,000 tons as compared with 600,000 tons used in 1943-44, an increase of 21 percent; for superphosphate 8.5 million tons in 1944-45 as compared with 7.2 million tons; for nitrate fertilizers 675,000 tons in 1944-45 as compared with 630,000 tons in 1943-44. About 1,000,000 tons of Chilean nitrates must be imported to reach minimum domestic demands.

## LONG SCREEN LIFE

### Starts with the Plate, Itself



For particularly severe screening jobs, Hendrick Perforated Plate, made from high-carbon, heat treated steel, possesses the hardness and toughness so essential in screening abrasive materials. Hendrick Perforated Plate is available with any desired shape or size of opening—round, square, hexagonal, slotted, or Squarround. It can be had flat, or rolled to any curvature; corrugated, or doubly-corrugated. Write for complete information.

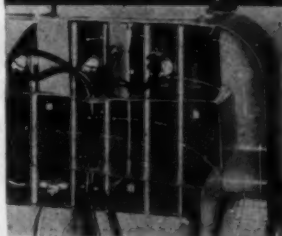
### HENDRICK MANUFACTURING CO.

47 Dundaff St., Carbondale, Pa.

SALES OFFICES IN PRINCIPAL CITIES  
PLEASE CONSULT TELEPHONE DIRECTORY

Makers of Elevator Buckets of all types. Milto Open Steel Flooring. Milto Shur-Rite Treads and Milto Armorgrids. Light and Heavy Steel Plate Construction.

## AIR in Abundance..

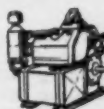


but it's  
**SCIENTIFICALLY**  
"RATIONED" for  
**WISCONSIN**  
**ENGINES**

The amount of air required for cooling the lower half of an engine cylinder won't do for the "business end", where the highly compressed fuel charge explodes.

With a continuous, large-volume air-flow to draw from, Wisconsin engineers have long since figured out just how much air to ration to each section of the engine, for most efficient cooling.

This is important in relation to the satisfactory performance of your power-operated equipment.



Most per H.P. pound  
**WISCONSIN MOTOR**  
Corporation  
MILWAUKEE 14, WISCONSIN, U. S. A.  
World's Largest Builders of Heavy-Duty Air-Cooled Engines



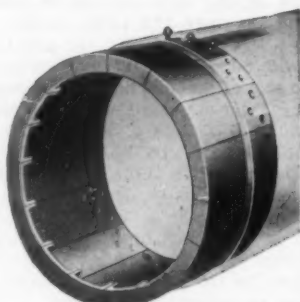
## Protection from Burn-Outs with PYRASTEEL KILN ENDS

Why run the risk of kiln-end "burn-outs" that cause serious shutdowns and costly repairs!

Play safe by installing PYRASTEEL Segmental Kiln Ends at both the discharge end, as illustrated . . . and also at the feed end of your cement kilns.

PYRASTEEL gives long and dependable service at high temperatures . . . as proved in scores of installations throughout the industry.

Write for Bulletin of this Heat-Resisting Alloy.



Showing discharge end of cement kiln fitted with PYRASTEEL Segmental Kiln Ends.

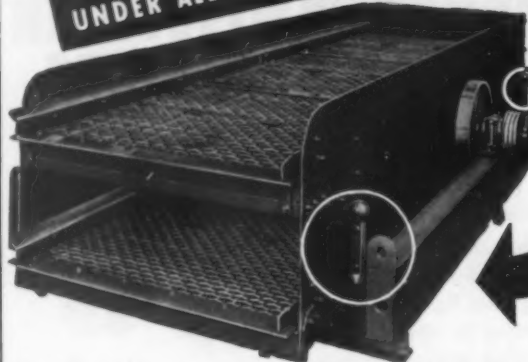


Unit segments are easy to install or replace.

**CHICAGO STEEL FOUNDRY COMPANY**  
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**PYRASTEEL** **CHICAGO 32, ILL.** **EVANSTEEL**  
for high temperatures Makers of Alloy Steel for 30 Years for strength

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GRADES ACCURATELY  
UNDER ALL LOAD CONDITIONS



Positively  
Controlled  
Gyrating  
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Operators everywhere report increased efficiency on every type screening job with dependable Seco Vibrating Screens. Seco's 100% uniform surface action pays off in accu-

rate grading, greater capacities and minimum of blinding. Screening damp, sticky ag-lime? Seco patented Auxiliary Vibrator keeps meshes open for efficient screening.

Send for New Catalog Today! Dept. B

## SECO

**SCREEN EQUIPMENT CO., INC.**  
9 Lafayette Ave. Buffalo 13, N. Y.

## Washington News

(Continued from page 49)

### Manpower Control

Beginning July 1, all male labor must be hired through the U. S. Employment Service or such channels as it may designate. This national program, Chairman Paul V. McNutt explained, results from the setting up of a nation-wide system of manpower priority referrals to give war industries the labor required. In some areas, women as well as men have been brought under the priority referral system. Areas in the following states require that women be hired through the U. S. Employment Service designated regions I, II, IV, V, VII, VIII, and XII, including Connecticut, Massachusetts, New Hampshire, Rhode Island, New Jersey, Delaware, Ohio, Florida, Georgia, Mississippi, Tennessee, South Carolina, Nevada, Oregon, Arizona and California. In some areas, employers of fewer than eight workers will be exempted. There are many communities throughout the country where there is no critical manpower problem, and employers in such communities may be exempted from compliance with the order. In some areas, employers of fewer than eight workers will be exempted. In New York City, which has a labor surplus, the regional director has departed somewhat from the national pattern in establishing the priority referral plan. There the plan will be applied only to less-essential employers of four or more employees.

### Increase Phosphate Rock Prices

An average increase of 20c a ton in producers' present maximum prices for Florida phosphate rock has been granted by OPA, under revised MPR 240, effective July 6.

### Boost Magnesite Output

NORTHWEST MAGNESITE CO., one of the largest magnesite producers in the United States, mined its Finch and Allen-Moss deposits and operated its seven kilns at Chewelah, Wash., at near capacity in 1943, according to a Bureau of Mines report. The calcined product was used chiefly for maintenance grade refractories, although the flotation concentrates and some of the regular output went into refractory brick production. Mine output in the United States of crude magnesite in 1943 reached the record quantity of 754,832 tons valued at \$6,071,596, compared to 497,368 tons valued at \$3,874,334 in 1942.

### Bituminous Mix Plant

W. E. HALL PAVING CO., Alhambra, Calif., has opened a new asphalt mix plant in Orange, Calif., costing \$45,000, on property owned by Consolidated Rock Products Co.

## Specifications

(Continued from page 151)

ratio of the maximum and minimum size limits of the aggregate. The shape of the particles is a factor which can not be determined by the distribution curve, but by consideration of the shape of the particles and characteristics of the distribution curve a number of useful relations can be calculated, such as surface area, and number of particles per gram. The size limits of the aggregate determines the type of probability relation between the percent passing by weight and the diameter of the particle sizes.

(To be continued.)

## Literature References

<sup>1</sup> Comparison of Methods of Specifying Aggregate Gradations Stanton Walker. Proc. Association of Asphalt Paving Technologists. 10:146, 1939.

<sup>2</sup> Methods of Representing Distribution of Particle Size, J. B. Austin. Ind. Eng. Chem. Anal. Ed. 11:334, 1939.

<sup>3</sup> Law of size distribution and statistical description of particulate material. P. S. Roller. J. Franklin Inst. 223:609, 1937.

<sup>4</sup> The Size-Frequency and Identification of Certain Phagocytosed Dusts, Philip Drinker. J. Ind. Hyg. 7:305, 1925.

<sup>5</sup> A Handbook of Petroleum Asphalt and Natural Gas, Roy Cross Bul. No. 16, Kansas City Testing Laboratory, Kansas City, Mo., 1922.

<sup>6</sup> The Manufacture and Testing of Asphalt Paving Materials, D. M. Wilson. Chem. & Ind. 51:61, 1932.

<sup>7</sup> The Construction of Roads and Pavements, T. R. Agg. McGraw-Hill Book Company, Inc., New York, 1924 3rd Ed. p. 337.

<sup>8</sup> Role of the Laboratory in the Preliminary Investigation and Control of Materials for Low Cost Bituminous Pavements, T. E. Stanton, Jr., and P. N. Hveem. Proc. Highway Research Board, 1935 Part 2, vol. 14, p. 14.

<sup>9</sup> Proportioning the Materials of Mortars and Concretes by Surface Areas of Aggregates, L. N. Edwards. Proc. A. S. T. M. 18: part 2, 236, 1918.

<sup>10</sup> Grading Aggregates, C. C. Furnas. Ind. Eng. Chem. 23:1052, 1931.

## Correction

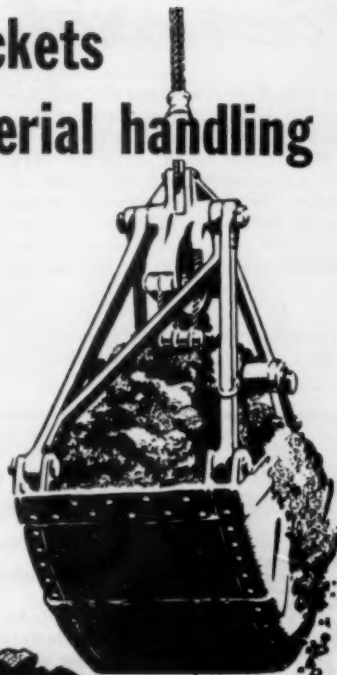
In the second and concluding article on Mica—A War Essential Mineral, appearing in *Rock Products*, June, 1944, starting on page 74, part of the material in the article was transposed from its original order. On Page 76, under the subtitle, "Trim," the material starting with the paragraph reading, "Nine different types of mica—," and continuing on page 114 to the subtitle, "Half Trim," should have followed at the end of the article on page 116.

## Open Agstone Plant

AN AGRICULTURAL limestone plant will be put into operation near the Alumina plant, a short distance from Harleyville, S. C., states Mr. Paylor, industrial agent for the Southern Railway. The capacity of the new plant will be 40 cars a day, stone being quarried on an 800-acre plot along the Southern Railway.

# Brownhoist Buckets for faster material handling

The deep-digging, hungry mouths of Brownhoist Clamshell buckets speed up the handling of coal, ore, gravel, dirt, cinders, clay, etc. Large sheaves reduce rope wear and maintenance. Sturdy construction and latest design insures long life. Available in rope-reeve, power-wheel and link type. Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York City, Philadelphia, Pittsburgh, Cleveland and Chicago.



BROWNHOIST BUCKETS GIVE MORE  
YEARS OF TROUBLE-FREE PERFORMANCE

## Two Aids to Increased Production

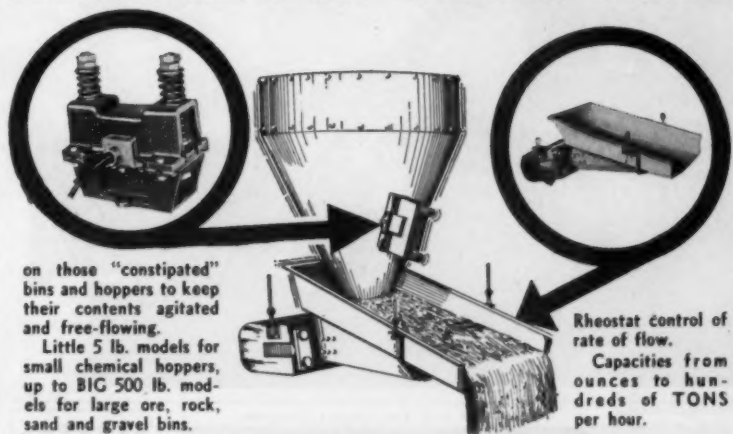
WITH  
REDUCED LABOR AND COSTS  
MAINTENANCE

# SYNTRON

"Adjustable Power"

"Vibra-Flow"

## ELECTRIC VIBRATORS VIBRATING FEEDERS



on those "constipated" bins and hoppers to keep their contents agitated and free-flowing.

Little 5 lb. models for small chemical hoppers, up to BIG 500 lb. models for large ore, rock, sand and gravel bins.

Rheostat control of rate of flow.

Capacities from ounces to hundreds of TONS per hour.

NO MOVING, WEARING MECHANICAL PARTS

Write us about your material handling problem.

SYNTRON CO.

450 Lexington

Homer City, Pa.

# Financial

FLORIDA PORTLAND CEMENT Co., Chicago, Ill., with plant at Tampa, Fla., reports a net profit of \$199,557 for the six months ended June 30, 1944. This compares with a net profit of \$266,938 for the six months ended June 30, 1943. Net sales for the first half of 1944 were \$1,396,249 as against \$1,801,245 for a similar period in 1943.

CONSOLIDATED CEMENT CORPORATION, Chicago, Ill., reported a net loss of

\$140,131, before federal income taxes, for the six months to June 30, 1944. For the first half of 1943 there was a net income of \$110,931. Net sales for the first half of 1944 were \$893,693 as against \$1,121,437 for the first six months of 1943.

HENRY J. KAISER Co., Oakland, Calif., San Francisco, Calif., recently took over the lease and operation of the Standard Gypsum Co., San Francisco, Calif. The transaction by which

the Kaiser interests received a 50 percent interest in return for its management and operating services was one of the biggest pieces of news to break in the gypsum industry for some time.

WARNER Co., Philadelphia, Penn., plans to retire \$3,534,000 outstanding 6s of 1951 and a short term lien of \$345,000 on properties now owned by American Lime & Stone Co., a subsidiary. The refunding is to be carried out by issuance of \$4,000,000 15-year 4s to be sold to Penn Mutual Life Insurance Co. The new bonds would be amortized by 1959.

SCHUMACHER WALL BOARD CORPORATION, Los Angeles, Calif., has presented the following income account for the year ended April 30:

	1944	1943
Gross profits .....	\$683,463	\$630,145
Selling, etc., expense ..	284,485	251,005
Depreciation .....	65,953	66,457
Operating profit .....	333,025	312,683
Other income .....	3,086	2,452
Total income .....	336,111	315,135
Other charges .....	7,507	248
Federal income tax .....	75,377	75,197
Excess profits tax .....	117,000	90,000
Post-war tax credit .....	cr 11,700	cr 9,000
Net profit .....	147,927	158,690
Preferred dividends .....	55,840	56,920
Common dividends .....	59,400	42,900
Surplus for year .....	32,687	58,870
Previous surplus .....	402,686	343,816
Debit .....	1,605	.....
Surplus, April 30 .....	433,768	402,686
Earn., preferred share:		
Priority basis .....	\$5.41	\$5.58
Participation basis .....	2.00	2.00
Earn., common share .....	1.40	1.54
No. of preferred shares .....	27,330	28,460
No. of common shares .....	66,000	66,000

Note: Renegotiation for year ended April 30, 1943, has been concluded and no refund was required. Company is subject to renegotiation for year ended April 30, 1944, but believes no excessive profits were realized.

PENNSYLVANIA-DIXIE CEMENT CORPORATION, New York, N. Y., has announced consolidated earnings for the twelve months to June 30:

	1944	1943
Net sales .....	\$6,287,408	\$10,812,938
Cost, expense, etc. ....	5,587,407	7,927,475
*Deprec. & deplet'n .....	497,225	511,035
Operating profit .....	202,776	2,374,428
Other income .....	94,552	45,562
Total income .....	297,328	2,419,990
Interest .....	123,899	190,718
Federal income tax .....	53,400	11,297,500
Net profit .....	120,029	931,772
†Times int. earn. ....	2.40	12.69
Earn., pfd. share .....	\$0.99	\$7.69
‡Earn., com. share .....	d 1.82	0.21
No. of pfd. shares .....	121,200	121,200
No. of com. shares .....	400,000	400,000

\*Additional depreciation charge to special reserve: 1944, \$408,343; 1943, \$439,285.  
†Before income and profits taxes.  
‡Disregarding preferred arrears.  
§Includes excess profits tax.

FEDERAL PORTLAND CEMENT Co., Buffalo, N. Y., reported a net income of \$55,887 for the year ended December 31, 1943. This compares with a

(Continued on page 162)



**"The winner of this war will be the side that moves the greatest amount of dirt in the shortest possible time"**

That statement, by a high-ranking officer in the South Pacific area, is graphic proof of the wartime importance of excavating machinery.

Moving dirt—or rock, sand, mud, gravel, shale, coal, coral, snow and ore—fast and efficiently, is a specialty of General-built equipment. And these excavating machines have the built-in stamina, power and adaptability to "go the distance in any kind of going."

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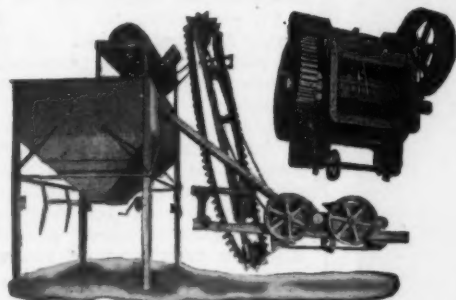
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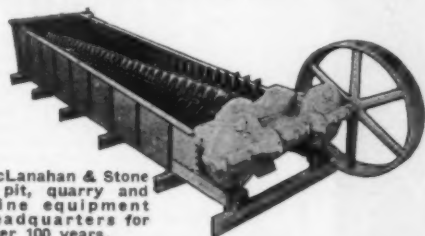
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It Lifts, Totes, Swings and Places Loads up to 5 Tons!



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## DAVENPORT LOCOMOTIVE WORKS

A DIVISION OF DAVENPORT BESLER CORPORATION DAVENPORT IOWA

(Continued from page 160)  
net income of \$52,911 for the calendar year 1942. Net sales in 1943 were \$1,238,033.

**LONGHORN PORTLAND CEMENT CO.**, San Antonio, Texas, had a net profit of \$102,480 for the six months ended June 30, 1944, which compares with \$122,305 for the six months ended June 30, 1943.

**NATIONAL GYPSUM CO.**, Buffalo, N. Y., reported net earnings for the first six months ended June 30, 1944, amounting to \$494,770, after provision for taxes, equal to 26c per share of common stock. This compares with \$442,658, or 22c a common share, for the first half of 1943. President Melvin H. Baker reported that sales for the period were up 14 percent. The six months' sales this year amounted to \$12,066,979, against \$10,585,292 for the like period of last year. Second quarter net earnings amounted to \$260,882 as compared with \$263,375 for the same period in 1943, while this year's second quarter sales totaled \$6,338,783 against \$5,797,063 in the second quarter of 1943.

**LEHIGH PORTLAND CEMENT CO.**, Allentown, Penn., has reported a net profit, after taxes, of \$808,472 for the twelve months to June 30, 1944, as compared with \$1,589,578 for the twelve months ended June 30, 1943.

## Far West Meetings

(Continued from page 69)

cisco; B. E. Oliver, California Rock and Gravel Co.; E. F. Brovelli, A. G. Streblow, president, and John R. Anderson, Basalt Rock Co., Napa; P. W. Schoeningh and Crawford Williamson, Perkins Gravel Co., Sacramento; Edwin T. Blake, Henry C. Steinbach, Gus Kuppe and Mr. Hall of Blake Brothers Co., Richmond; Forrest Brown and Mr. Silverman, Hutchinson Co., San Rafael; W. M. and Jack Nelson, Cordelia Quarry, Cordelia; Mel Hein, Hein Bros., Petaluma; James E. Beatty, Oakland, and M. H. O'Brien, Oakland.

One of the problems which seemed to puzzle producers the most, at this meeting, was that of payment for overtime for the seventh consecutive day of work. Secretary Ahearn explained the President's directive order on payment for overtime which provides time-and-a-half for the seventh consecutive work day whether Sunday or not. There is no order to pay overtime for Sunday as such, and the order prohibits double-pay, union contract or not. This point did not seem to be well understood, although the order provides no penalties if not observed.

### Los Angeles Meeting

SECRETARY AHEARN and the writer were royally entertained for several days in Los Angeles by Robt. Mitchell and John Gregg. The largest of all

the meetings was held there, at which 87 representatives of producer companies were present. H. G. Feraud, who is a kind of secretary of the producer organization in Southern California, presided. Mr. Mitchell, as president of the National Sand and Gravel Association, presided, and said many just and complimentary things about Secretary Ahearn and the work he has done and is doing for the industry. The gist of discussions was very much as in the preceding ones. No attendance record was made except by companies, and in nearly every instance the presidents and executive officers were there.

#### LOS ANGELES COUNTY

Blue Diamond Corporation.....	8
Graham Bros., Inc.....	7
John D. Gregg.....	5
Consolidated Rock Products Co.....	14
Azusa Rock & Sand Co.....	3
Chandler's Palos Verdes Sand Co..	1
Edward Sidebotham & Son, Inc....	1
Richard R. Ball.....	1
Manning Bros. Rock & Sand Co....	2
Owl Rock Products Co.....	5
Granite Materials Co.....	2
Arrow Rock Co.....	1
Transit Mixed Concrete Co.....	4
E. Lockett & Sons.....	3
Security Materials Co.....	3

#### SAN BERNARDINO COUNTY

Triangle Rock & Gravel Co.....	8
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#### RIVERSIDE COUNTY

Service Materials Co.....	3
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#### VENTURA COUNTY

Saticoy Rock Co.....	5
El Rio Rock Co.....	2
Montalvo Rock Co.....	2

#### KERN COUNTY

Kern Rock Co.....	2
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#### SAN FRANCISCO COUNTY

Pacific Coast Aggregates, Inc.....	1
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The representative of the Pacific Coast Aggregates, Inc., was Edward J. Goodpastor, vice-president, who traveled with the party from San Francisco.

In addition to the dinner meeting of producers, there was a luncheon meeting the following day which included prominent business men in all walks of life in Los Angeles. All seemed much interested in Secretary Ahearn's description of present industrial problems. Among those present was Richard W. Lund, of the Regional War Labor Board.

### Pavement Yardage

AWARDS of concrete pavement for June, 1944, have been announced by the Portland Cement Association as follows:

	Square Yards Awarded During June, 1944
Roads .....	1,611,278
Streets and Alleys.....	843,241
Airports .....	3,288,683
Totals .....	5,743,202

**SHEFFIELD STEEL CO.**, is building a slag crushing plant at Houston, Texas. W. S. Bellows Construction Co., has the contract to build the plant.

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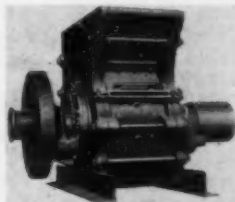
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## Danger in Paying Employees Withholding Tax

By HAROLD J. ASHE\*

**N**OT LONG AGO the operator of a small sand and gravel plant sought me out for aid in untangling his final withholding statement to the Government for the year. It seems that he had not withheld any income tax from some of his favored employees, assuring them that he would pay it. Now the day of reckoning was at hand.

Quite a few employers, in an effort to pacify restless employees and under the constant threat of expensive labor turnover, are undertaking to pay employees withholding taxes.

This practice undoubtedly grows from the law that makes an employer responsible for such a tax in event it was not withheld and employers voluntarily paying these taxes have interpreted this as a green-light to take on this added expense.

Actually, the responsibility of the employer to pay the tax where he has failed to withhold is not, in fact, an encouragement of the practice. It is merely a means to prevent evasion of withholding and was never meant as anything else. It is really intended as a penalty against the employer.

Recently the Internal Revenue department has ruled that where the employer pays the withholding of his employees that the amount of the withholding paid is, in itself, additional income of the employees and, therefore, subject to withholding tax, too.

As an example, an employer pays an employee who is single \$35.00 weekly and the exemption is \$12.00. The exact withholding amounts to \$4.60, which the employer does not deduct but undertakes to pay, himself. In effect, then, the employer is actually paying the employee \$39.60 instead of the apparent \$35.00. By the department's interpretation, this would seem to figure out this way: \$39.60 minus \$12.00 exemption or \$27.60 subject to withholding of \$5.52 instead of \$4.60. This calculation, too, would be off. The only way to resolve the problem would be with the following formula: \$12.00 exemption from \$35.00, leaving \$23.00 net after withholding and exemption, which is four-fifths of the amount subject to withholding. Five-fifths of this sum would be \$28.75. One-fifth (the withholding) would be \$5.75. The amount of \$28.75 subject to withholding plus \$12.00 exemption would add up to a total wage of \$40.75 instead of either \$35.00 or \$39.60.

It can be seen immediately that this practice of paying withholding

\*Tax Counselor, Los Angeles, Calif.

understates the employees' wages for the purpose of social security or unemployment deductions and, at a later date, any benefits unless the correct formula is used.

In his own income tax return the employer would find it necessary also to show such tax payment as wages—and not an employee's tax paid by the employer, as such a latter deduction in determining net gain or profit would no doubt be disallowed.

Incidentally, such a practice, in fact, constitutes a wage increase in every sense, regardless of the employer's intent or innocence of motive, and not merely for income tax purposes. It would probably be construed as a violation of the Wage and Salary Stabilization Act, a law applicable to all employers of eight or more employees.

The penalty for violation of this Act is most severe. Here, for purposes of establishing the employer's deductible business expenses to determine his income subject to income tax, it might be ruled that all wages and salaries paid to those receiving such an increase be disallowed. Little imagination is required to see what this might mean in terms of additional tax. With wages deducted, the employer might have a taxable income of say \$5,000; with wages disallowed, this taxable income might jump to \$25,000. Instead of paying roughly \$1,100 tax he might be presented with a tax bill of upwards of \$8,200.

### May Employ Women

News reports state that the Bonner Springs, Kans., plant of Lone Star Cement Corporation may hire women to work in the mill, the first time in the history of the plant, according to Superintendent Arnold Fairchild. Mr. Fairchild said that there are about 12 jobs in the mill that can be handled very nicely by women. Operation of another kiln will be started if sufficient labor can be obtained.

### New Silica Deposit

HIGH GRADE SILICA SAND, said to be 96.64 percent pure, has been located along Crows Fork Creek, southeast of Fulton, Mo. The deposit at the Kroell farm was located by W. N. Jennings, one of the owners of the Middle River Coal Company, and tests also were made at the request of the Alton railroad which is interested in developing the properties. A glass factory, using this sand, is contemplated for this section as a post-war project.



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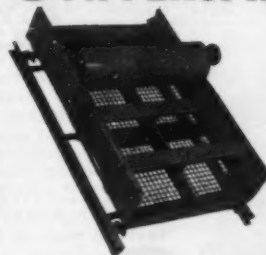
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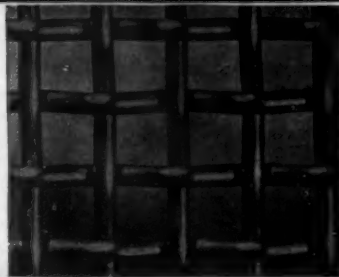
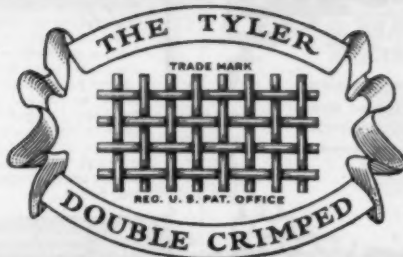
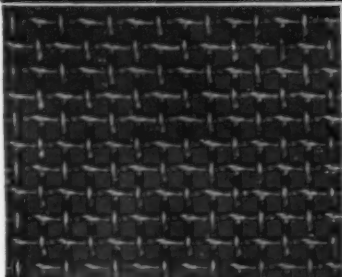
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## Lime Safety Winners

NATIONAL LIME ASSOCIATION's safety competition for 1943 conducted by the Bureau of Mines has revealed the York, Penn., plant of the National Gypsum Co., as the winner for working 302,951 man-hours without a lost-time injury. Eight other plants, which also operated without a lost-time accident during the year but with fewer man-hours of exposure, will receive Certificates of Honor from the Association.

The other quarries receiving Certificates of Honor are as follows:

Kimbalton plant, Kimbalton Lime Co., Pearlsburg, York County, Pa., 142,740 man-hours; Knoxville plant, Standard Lime & Stone Co., Knoxville, Knox County, Tenn., 121,499 man-hours; Winoski plant, Champlain Valley Lime Co., Chittenden County, Vt., 63,466 man-hours; Quincy plant, Marblehead Lime Co., Quincy, Adams County, Ill., 52,109 man-hours; Marblehead plant, Marblehead Lime Co., Marblehead, Adams County, Ill., 35,076 man-hours; Falls Village plant, United States Gypsum Co., Falls Village, Litchfield County, Conn., 28,660 man-hours; Old Camp plant, Florida Lime Products Co., Ocala, Marion County, Fla., 27,257 man-hours; and Houston plant, Nyotex Chemicals, Inc., Houston, Harris County, Tex., 27,064 man-hours.

Evidencing the increased regard for

safety by the industry, 61 plants in 22 States—the largest number ever enrolled—entered the 1943 competition and these plants worked a total of 11,120,508 man-hours, or more than five times the man-hours of exposure represented in the first contest in 1935.

For the York plant of the National Gypsum Co. the first-place honors of 1943 represents a "repeat performance." This plant, which was enrolled in the first contest of 1935, took first place in the 1939 competition.

Although large quantities of explosives were used by the competing companies last year not a single lost-time accident involving explosives occurred, statistics showed.

## Organize Ready Mix Concern

LA CROSSE READY MIX COMPANY, La Crosse, Wis., has been organized with Emil Fehr, president of the Fehr Concrete Pipe Works, as president; A. O. Ayres, president of the Eau Claire Sand and Gravel Co., as vice-president and treasurer; and Oscar H. Kittilstad, general superintendent of the Eau Claire Sand and Gravel Co., as superintendent of the ready mixed concrete plant. The plant will be located near the offices and plant of Fehr Concrete Pipe Works. Six 3-cu. yd. transit mixer trucks are to serve the plant.



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MEXICO, D. F.: Edificio Interoceano, Calle Edoe No. 7  
MIDDLESEX, ENG.: 1923, Manchester Rd. (London)  
BIRMINGHAM, ENGLAND: 138 Edmund Street  
JOHANNESBURG, S. AFRICA: 8 Pelham Road

**DENVER EQUIPMENT COMPANY, 1400 17th St., Denver, Colorado**



## OBITUARIES

M. G. MOORE, owner and operator of the Cooke Stone Co. on Greenville Road, Hopkinsville, Ky., died recently at the age of 58.

JAMES J. CALKINS, secretary-treasurer of the Monolith Portland Cement Co. and of the Monolith Portland Midwest Co., Los Angeles, Calif., died recently. He was 58 years old. Mr. Calkins was the first to install the accounting system of the Portland Cement Association on the Pacific Coast, shortly after he became associated with the Monolith Co. in 1919.

CHARLES S. LINCOLN, chief designing engineer in the crushing, cement and mining machinery department of the Allis-Chalmers Mfg. Co., Milwaukee, Wis., died recently at the age of 59. He had been with the company for 39 years.

WILLIAM ORLANDO WILLISON, president of the Pike River Granite Co., Marinette, Wis., died recently at the age of 74. He is survived by his widow and one son.

WILLIAM HARTLEY LINDSAY, general manager and secretary-treasurer of Canada Crushed Stone, Ltd., Hamilton, Ontario, Canada, passed away recently. He was 79 years old. Mr. Lindsay had been with the company for the last 20 years.

DANIEL C. GREEN, chairman of the board and chief executive officer of the Cleveland Pneumatic Tool Co., Cleveland, Ohio, died July 2 at Petoskey, Mich. Mr. Green was known nationally as a financier and consultant in the operation of public utility properties and had been made chairman of Cleveland Pneumatic at the request of the W.P.B. shortly after the death of L. W. Greve. He was named president in July, 1943, when John DeMooy resigned, later gave up the presidency to George P. Torrence, and became board chairman, which position he held at the time of his death.

CLOYD M. CHAPMAN, consulting engineer, New York City, and widely known as a materials and testing specialist, particularly in the field of concrete, died July 2 at the age of 70. Mr. Chapman was president of the American Society for Testing Materials in 1932, and had been active in its councils since 1908. He served for over 25 years on both the cement and the concrete committees, being chairman of the latter from 1926 to 1932. He was also on committees concerned with lime and laboratory equipment.

(Continued on page 168)

**PULVERIZERS** for the reduction of Cement Materials, Limestone, Agricultural Limestone, Fire Clay and All Dry, Refractory Materials.

Capacities: 1 to 60 tons per hour

Finenesses: 20 to 350 mesh

# BRADLEY PULVERIZER CO.

ALLENTOWN, PENNA.

To Increase Capacities or Fineness of Present Grinding Plant—  
To Reduce Power and Maintenance Costs—  
To Insure an Absolutely Uniform Product—

**Use the BRADLEY AIR SEPARATOR**



**NEW  
HOLLAND  
Model 30**

... for **GREATER  
TONNAGES**  
in Agstone and  
the Finer Aggregates

- Adjustable swinging hammers with renewable multi-point hammer tips.
- Welded steel plate construction.
- Adjustable breaker plate.
- Tramp iron pocket.
- Heavy duty roller bearings.
- And other features.

Write Industrial Division for complete details about the new Model 30 and the complete line of New Holland hammer and roll crushers.

## NEW HOLLAND MACHINE CO.

NEW HOLLAND, PENNSYLVANIA

## S & P CEMENT KILN OIL BURNING EQUIPMENT

For Rotary Cement, Lime, Clay or Ore Kilns

Low or high pressure air atomizing type oil burners, oil pumping and heating equipment, strainers, meters, blowers and compressors, and fuel oil pre-heaters.

In use at: "La Tolteca," "Apasco," "Pacifcos," "Guadalajara," and other plants in Mexico, as well as many plants in the U. S.

## STAPLES & PFEIFFER

530 Bryant Street

Cable address: SANDP

San Francisco 7, Calif.

## MANGANESE STEEL CASTINGS

for  
PULVERIZERS  
CRUSHERS  
ROLLS  
SCREENS



for  
SHOVELS  
DREDGES  
CRANES  
CONVEYORS

## The Frog, Switch & Mfg. Co.

Established 1881

CARLISLE, PA.

# RYERSON STEEL IN STOCK

Call Ryerson when you need steel — any kind, shape, or size. Large stocks are available at ten convenient plants. Ask for a Ryerson Stock List — your guide to quick shipment of steel.

## Principal Products Include:

Bars • Shapes • Structural • Plates • Sheets  
Floor Plates • Alloy Steels • Stainless Steel  
Shafting • Screw Stock • Wire • Mechanical  
Tubing • Boiler Tubes • Reinforcing Steels  
Tool Steels • Bobbitt • Nuts • Bolts • Rivets  
Welding Rod • Etc.

**JOSEPH T. RYERSON & SON, Inc.**

## Plants at:

CHICAGO, MILWAUKEE, ST. LOUIS, DETROIT,  
CINCINNATI, CLEVELAND, BUFFALO, BOSTON,  
PHILADELPHIA, JERSEY CITY

JOHN W. KENNEDY, general sales manager, Huron Portland Cement Co., Detroit, Mich., passed away July 29. His death followed within seven months his appointment as general sales manager to succeed A. J. Rooney who died on December 11, 1943. Mr. Kennedy attended the University of Michigan where he received his M.S.E. degree. He was on the University faculty and staff of the Michigan State Highway Department from 1921 to 1925 when he left his position as acting director of the State Highway Laboratory to become administrative assistant for the Portland Cement Association. He then went with the Huron Portland Cement Co. and organized the technical service bureau of which he was director until his appointment as assistant sales manager in 1942. Mr. Kennedy was a member of the American Society of Civil Engineers, American Society for Testing Materials, American Concrete Institute, Engineering Society of Detroit, and Michigan Engineering Society. He served as a member of the Portland Cement Association Technical Problems Committee from 1938 to 1943.

Dr. FRANK J. TONE, chairman of the board of the Carborundum Co., and father of Franchot Tone, motion picture actor, died July 26 at his home after a long illness. He was 75

years of age. Dr. Tone originated the first commercial process for production of silicon metal, and also discovered the silicon carbide heating elements, fibrous silicon oxycarbide and silicon monoxide.

H. EDWARD MANVILLE, Sr., former president and chairman of the board of the Johns-Manville Corp., New York, N. Y., died June 27 at his estate in Pleasantville, N. Y.

## Sand-Lime Brick Production and Shipments

Four active sand-lime block and brick plants reported for June and four for May, statistics for which were published in July, 1944.

## AVERAGE PRICE FOR JUNE

	Plant Price	Delivered Price
Detroit, Mich. ....	.....	\$17.00
Saginaw, Mich. ....	\$15.00	.....
Grand Rapids, Mich. ....	.....	16.20
Seattle, Wash. ....	19.50	21.50

## STATISTICS FOR MAY AND JUNE

	*May	**June
Production .....	751,812	855,722
Shipments (rail) ....	175,000	171,000
Shipments (truck) ...	554,812	800,722
Stocks on hand .....	890,000	820,000
Unfilled orders .....	3,085,000	950,000

\*Four plants reporting: incomplete, one not reporting stocks on hand and one not reporting unfilled orders.

\*\*Four plants reporting: incomplete, one not reporting stocks on hand and two not reporting unfilled orders.

## We Own and Offer NEW and USED EQUIPMENT

### SPECIAL

DIESEL GENERATOR SET—300 HP. Fairbanks-Morse Diesel, 6 cylinder, Model 32 complete with auxiliaries, 257 RPM, direct connected to a 350 KVA Fairbanks-Morse Generator, Type D, 3 phase, 60 cycle, 230 volts, V-Belt Drive to Exciter. Complete with panel boards, etc.  
ROTARY CONVERTER—1000 KW Westinghouse, Transformer and auxiliaries.  
TURBINE—100 HP. Westinghouse 2700 RPM gear reduction, 2-1.  
AIR COMPRESSOR—1. B. Duplex, 100 HP. motor and receiver. Capacity 587.  
STEEL GUY DERRICK—110' mast 90' boom —3 drum Clyde hoist, electric.

### CRANES & SHOVELS

- 1—P.A.H. 1-yd. SHOVEL, Gasoline, Reconditioned.
- 1—Marion 32 Steam 1½-yd. SHOVEL.
- 1—LOCOMOTIVE, 4-wheel, 10 ton, 25' boom, Brown Hoist Co.
- 1—OVERHEAD, 10 ton, 74'4" span, air operated.

### CONVEYORS & ELEVATORS

Various sizes.

### DRILLING EQUIPMENT

- 1—No. 40 I. R. Drill sharpener.

### COOLERS & DRYERS

- 1—3½ x 40 ft.
- 1—7' x 56'.
- 1—18 x 90 ft., and others.

### CRUSHERS

All types, various sizes.

### ELECTRIC MOTORS

Large stock, rebuilt, AC or DC.

## WANTED

DIESEL AND GENERATING EQUIPMENT  
CEMENT MANUFACTURING EQUIPMENT

## WEBBER EQUIPMENT CO.

17 East 45th St.

MU. 2-4511

New York 17, N. Y.

### FEEDERS

2—BAILEY FEEDERS, Type No. 2, complete with steel hoppers, 8½ ft. dia. x 12 ft. cone bottom.

### GRINDING EQUIPMENT

1½ x 20 ft. TUBE MILLS, F. L. Smith Co.  
5 x 22 ft. TUBE MILL.  
5 x 10 ft. TUBE OR BALL MILL.  
1—4-roll RAYMOND MILLS.

### KILNS

Vulcan 7' x 120', like new. And other sizes.  
1—8 x 9½ x 180 ft. And others.

### SYNCHRONOUS MOTORS

1—1900 HP, 25 cycle, 2300 V.  
2—1250 HP, 25 cycle, 2300 V.

### TANKS

Up to 55,000 bbls.

## ARMSTRONG-BRAY STEELGRIP

PERKINS BELT LACING



## ARMSTRONG-BRAY STEELGRIP

FLEXIBLE BELT LACING

8 sizes boxed or in long lengths for wide conveyor belts. Best for rubber and fabric belts because it compresses belt ends and prevents fraying. Applied in a few minutes with a hammer. 2-piece hinged rocker pins.

Also, WIREGRIP Belt Hooks that fit any lacing machine. IMMEDIATE DELIVERY on both types.

Write for Circulars.

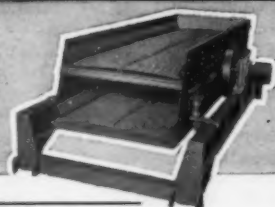
**Armstrong-Bray & Co.**

"The Belt Lacing People"  
5386 Northwest Highway  
CHICAGO 30, U. S. A.

## DIAMOND BALANCED VIBRATORS



Violent vibration for fast, positive separation all over the screen—controlled by accurately balanced design for smooth action. Long life, low maintenance costs. No choke. Fast delivery. 11 Sizes in 1-2-2½-3-4 Decks. Tell us your needs. Write for Bulletin D42V.



**DIAMOND IRON WORKS, INC.**  
AND THE MAHR MANUFACTURING CO. DIVISION  
1800 NORTH SECOND ST., MINNEAPOLIS 11, MINNESOTA

## New Incorporations

LaCrosse Ready Mix Co., Eau Claire, Wis., has been organized for the operation of a general manufacturing and sales business of concrete and allied construction and building materials, with a capital of 500 shares of stock at \$100 a share. Incorporators are Emil Fehr, Alb. O. Ayres, and L. J. Larson. Wilcox, Wilcox & Sullivan, Eau Claire, are the agents.

Slag Products Co., 11717 Buffalo Ave., Chicago, Ill., has been incorporated to engage in the manufacture of lightweight and special slagcrete and concrete products, with a capital of 2000 shares of common stock, par value \$10. Incorporators are W. F. May, D. E. Feldes and E. E. Dobbon. A. B. Manion, 10 S. LaSalle St., Chicago, Ill., is the correspondent.

Loring Quarries, Inc., Bonner Springs, Kans., has obtained a charter to operate a \$25,000 stone business. Guy E. Stanley, Jr., of Kansas City, Kan., is resident agent and an incorporator.

Charleston Sand Corp., Charleston, S. C., has filed incorporation papers with a capital of \$50,000. Adrian V. Criss, Parkersburg, S. C., is the correspondent.

## Manufacturers' News

American Air Filter Co., Inc., Louisville, Ky., announces the following changes in its organization: W. G. Frank has been made assistant to the president, W. M. Reed; H. C. Murphy, vice-president, has been appointed general sales director; John Hellstrom, vice-president, continues as head of the dust control division;

Howard W. Pound will be in charge of the air filter division, and Wm. K. Gregory will direct the special products division.

Eagle Iron Works, Des Moines, Iowa, announces that Lt. Col. C. B. Laird, for years sales manager of the company, will resume his duties after three and a half years with the Mechanized Cavalry. While the manpower and equipment of the Eagle Iron Works will continue on vital war production for the duration, many firms served by this company are already making plans for post-war installations of new equipment. Col.



Lt. Col. C. B. Laird

Laird's advice and counsel will be available to all customers in solving materials, classifying and washing problems and in planning for post-war improvements.

Athey Truss Wheel Co., Chicago, Ill., has promoted B. F. Lease, sales manager, to vice-president in charge of sales, advertising and service. Mr. Lease has been with the company since 1931.

Electric Machinery Mfg. Co., Minneapolis, Minn., announces that R. H. Olson, manager of the New York district office, has been appointed to the position of vice-president in charge of sales, with headquarters in Minneapolis. A. F. Burris will take over the duties of district manager at New York.

Bethlehem Steel Co., Bethlehem, Penn., has elected H. H. Fuller vice-president in charge of West Coast steel activities, to succeed W. H. Stewart who is retiring from active duty. Mr. Stewart has held the office for the past 12 years and will



Made of  
Acid Open Hearth  
Steel Wire

Round Strand  
Flattened Strand  
Preformed  
Steel Clad  
Non-Rotating

The Service Record of this  
wire rope continues to make  
and hold friends.

MADE ONLY BY  
**A. LESCHEN & SONS ROPE CO.**

Established 1857

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St. Louis, Mo.

New York — Chicago — Denver  
San Francisco — Portland — Seattle



## "WIRE SCREENS? SURE BILL—BUY 'CLEVELAND'—WE DO!"

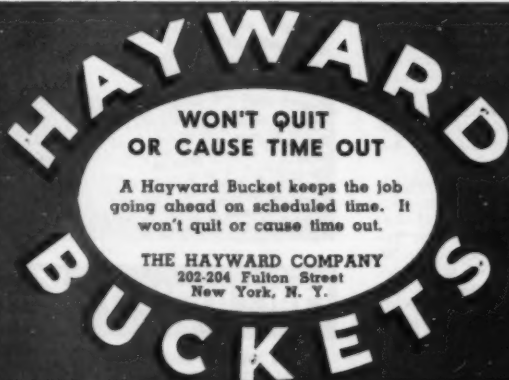
Tough, Durable, Accurate Wire Screens for Vibrators or Rotary Jackets

Cleveland is the "Buy" Word of Quality

**THE CLEVELAND WIRE CLOTH & MFG. CO.**

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CLEVELAND, OHIO



**ARMSTRONG-BRAY**  
Gear and Wheel Pullers



## Prompt Shipments from Stock

STEELGRIP Standard Rigid Arm Gear and Wheel Pullers are of improved design. Will not slip from work. Arms are forged and heat-treated. 2-arm, 3-arm and special models. 12 types and sizes. CHAINGRIP Universal Pullers pull wheels, solid gears, pinions, etc., even at considerable distance from end of shaft. Proof-tested chains have both chain hooks and special pulley hooks. 3-ton and 12-ton capacities.

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**Armstrong-Bray & Co.**

"The Belt Lacing People"

5386 Northwest Highway, Chicago, U.S.A.



## LOWER COSTS FOR DIGGING and CONVEYING



Sauerman Slackline Cableway  
Digging a Large Deep Pit

**W**HERE materials such as sand, gravel, blasted rock, etc., must be dug, hauled, and dumped at ranges from 100 to 1000 ft. or more, the economical way to do it is with a Sauerman Scraper or Cableway.

First cost and upkeep of a Sauerman machine are low, and the simplicity of operation permits one-man control of even the largest installation.

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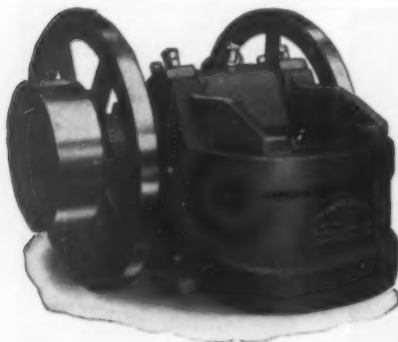
**SAUERMAN BROS., INC.**

530 S. Clinton St. Chicago 7, Illinois

## FARREL BACON CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants.

Engineering Service



**EARLE C. BACON, Inc.**

17 John St., New York, N. Y.

continue in an advisory and consulting capacity. C. M. Mackall will succeed Mr. Fuller as manager of sales in New York. Bennett C. Macgregor, formerly manager of sales, St. Louis district, will succeed Mr. Mackall as general manager central sales. C. H. Cecil has been named to succeed Mr. Macgregor as manager of sales at St. Louis, Mo., coming to this position from the sales force in the Chicago district.

United States Rubber Co., New York, N. Y., has appointed Stanley W. MacKenzie as director of purchases, to succeed George M. Tisdale, recently elected a vice-president and member of the executive committee of the company.

Insley Mfg. Corp., Indianapolis, Ind., has announced the appointment of George J. Dimond as sales manager, to succeed Ray W. Dorward, who has retired.

Hercules Powder Co., Wilmington, Del., announces that C. A. Higgins, president, has been made chairman of the board to succeed R. H. Dunham, who will continue as a director and chairman of the finance committee.

Markley Dust Control System, Inc., Mamaroneck, N. Y., announces that Ralph B. Carter Co., 192 Atlantic St., Hackensack, N. J., has created a dust collector division in their company and will manufacture and sell the Markley-Carter dust collector.

Mack Trucks, Inc., New York, N. Y., has appointed Dr. Walter M. Mitchell as director of research to direct chemical, metallurgical, electrical, mechanical, Diesel, fuels, lubricants and other research activities allied to the firm's products.

Caterpillar Tractor Co., Peoria, Ill., has announced the appointment of L. C. Allenbrand as manager of the merchandising department, to succeed H. R. Murphy, who is leaving the company to become associated with the Caterpillar distributorship in San Antonio, Texas.

Cleveland Pneumatic Tool Co., Cleveland, Ohio, has announced the promotion of two veteran employees to top-ranking production posts. A. B. Johnson, who has been with the company 28 years, has been named plant manager and will have complete responsibility for all manufacturing facilities. Conrad W. Wallin, who joined the company in 1940 to assist the planning of plant expansion, has been appointed plant manager of Cleveland Pneumatic Aerol, Inc., a wholly-owned subsidiary.

Hyster Co., Portland, Ore., manufacturers of tractor winches, hoists, cranes and a complete line of industrial gasoline driven lift trucks, announces that the firm name has been changed from Willamette Hyster Co. to Hyster Co., also that W. B. Morrow, formerly personnel manager, will head a new department of confidential nature; Cliff Dunham, who has been in charge of the Chicago office, becomes personnel manager; Donald Foster of the purchasing department in Portland, will go to Chicago as office manager.

National Powder Co., Eldred, Penn., announces the opening of a branch office in the First National Bank Bldg., Latrobe, Penn., with P. T. Rogers as manager, also that Gene H. Edwards of Latrobe, Penn., has joined the organization as a special representative of the sales department in the anthracite and bituminous coal industry.

Truckstall Mfg. Co., Cleveland, Ohio, a stockholder distributor organization consisting of approximately 40 national distributors of truck equipment, has recently been incorporated. Donald W. Meyer, one of the founders of the company, is president; J. D. Maynard of Detroit, C. A. Bieber of Cleveland and Walter Blaul of Chicago are vice-presidents directing the various committees. F. J. Hessler of Cleveland is secretary-treasurer; Milton W. Anderson, one of the founders, is chairman of the board.



Male  
or  
Female  
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Recognized Universally  
as the **ULTIMATE** in  
Valves and Couplings

**KNOX  
MANUFACTURING CO.**

818 CHERRY ST., PHILA. 7, PA.

Since 1911 Producers of

**KNOX**  
Valve-Couplings-Nipples-Clamps-Hangers



**YOU CAN  
DEPEND  
ON...**

**MAXIMUM  
SCREENING  
EFFICIENCY**

with  
*Perforated*

**METAL  
SCREENS**

by  
**HARRINGTON & KING**

Write for  
Catalog and  
Prices

**Harrington & King**  
PERFORATING CO.

3630 Fillmore St., Chicago 44, Illinois  
114 Liberty St., New York 6, N. Y.

Thermoid Co., Trenton, N. J., has announced the appointment of A. C. Teetsel as manager of friction materials manufacturing, and Albert Grindy as comptroller of the company and its subsidiaries.

Gar Wood Industries, Inc., Detroit, Mich., has announced that Clinton W. Wood, formerly vice-president and manager of Plant 4, has been named vice-president in charge of manufacturing. Alonzo R. Ketcham, formerly production manager of winch war contracts, will be production control manager and will be responsible for personnel management, machine and departmental scheduling of product manufacturing. Henry Kvindlog has been made general superintendent of the mechanical division.

Independent Pneumatic Tool Co., Chicago, Ill., has appointed Henry H. Ritchette manager of the contractor's tool division, with headquarters in Chicago, Ill.

Wickwire Spencer Steel Co., New York, N. Y., has purchased the business and assets of the Sirian Wire & Contact Co., Newark, N. J., and will immediately assume full control of all management and production operations of the Sirian company under a new subsidiary company known as the Wickwire Spencer Metallurgical Corp., 260 Sherman Ave., Newark, N. J. Officers of the new company are E. P. Holder, president; Lt. Col. Cecil P. Young, retired, executive vice-president; George H. Creveling, treasurer; Franklin Berwin, secretary. Operations will be under the direction of Col. Young.

Caterpillar Tractor Co., Peoria, Ill., has announced that Howard R. Murphy, manager of the merchandise department, has resigned to become associated as a principal with W. K. Holt in the Caterpillar distributorship in San Antonio and Corpus Christi, Texas.

Babcock & Wilcox Co., New York, N. Y., has appointed John C. Traphagen chairman of the board.

The Euclid Road Machinery Co., Cleveland, Ohio, announces the appointment of Columbia Equipment Co., 1240 S. E. 12th Ave., Portland, Ore., as distributors of Euclid equipment in Washington and Oregon, headed by P. B. McBath, president; F. L. Jerome, vice-president, and R. R. Hicks, sales manager, of the Columbia Equipment Co.

Oliver United Filters, Inc., New York, N. Y., announces that J. F. Mitchell-Roberts, manager of the foreign and export division, has resigned his position with the company.

LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa, pioneer builders of earth-moving and road machinery, has appointed C. H. Lage general works manager. He will have charge of all plant operation and production carried on by the company.

Wickwire Spencer Steel Co., Buffalo, N. Y., has promoted B. L. McCarthy, chief metallurgist, to the position of assistant general superintendent, and C. A. Gordon to the position of superintendent of hot departments, both at the Buffalo plant.

The Osgood Co. and The General Excavator Co., associate excavating and materials handling equipment manufacturers of Marion, Ohio, have named seven new distributors: Acme Equipment, Detroit, Mich.; Arthur C. Leake, Middletown, Va.; Municipal Sales Co., Richmond, Va.; Walling Tractor & Equipment Corp., Portland, Ore.; H. L. Baxter, Toronto, Ont., Canada; Rousseau Equipment Co., Winnipeg, Manitoba, Canada; Dominion Distributors, Ltd., St. John's, Newfoundland.

Willamette Hyster Co., Portland, Ore., and Peoria, Ill., has named John F. Johannsen export manager for the company.

Atlas Powder Co., Wilmington, Del., has announced the retirement of E. W. Moorehouse, Philadelphia district manager, after 44 years of continuous service with the explosives industry.

The Lincoln Electric Co., Cleveland, Ohio, has appointed G. L. Revell as district manager of the Portland, Ore., office, succeeding E. H. Well, who is now a lieutenant in the Navy.

Davey Compressor Co., Kent, Ohio, announces that S. J. (Jack) Perlow, formerly associated with Johnson, Drake & Co. on Army Base construction projects in Eritrea and Egypt, has been appointed eastern manager, with headquarters at 330 West 42nd St., New York, N. Y.

American Holst & Derrick Co., Plant No. 2, South Kearny, N. J., is the new name of the American-Terry Derrick Co., South Kearny, N. J.

## Army-Navy Awards

Independent Pneumatic Tool Co., Aurora, Ill., producer of Thor pneumatic and electric tools used in production and assembly of fighting machines and weapons, has received a third renewal of its Army-Navy "E" award won originally on October 8, 1942.

Whiting Corp., Harvey, Ill., has received a second White Star for its Army-Navy "E" flag for continued meritorious service on the production front.

United States Rubber Co., Stark Mills plant, Hogansville, Ga., has been awarded the Army-Navy "E" pennant for high achievement in the production of war equipment.

Clark Tractor Division of Clark Equipment Co., Battle Creek, Mich., has won for the third time the Army-Navy Production Award, which adds a second White Star to its "E" flag.

The Foxboro Co., Foxboro, Mass., has received a second White Star for its Army-Navy "E" Award for meritorious service on the production front.

Kensington Steel Co., Chicago, Ill., has won for the third time the Army-Navy Production Award for high achievement in the production of war material. This second renewal adds a second White Star to its Army-Navy "E" pennant.

# Classified Advertisements

POSITIONS WANTED — POSITIONS VACANT Set in six-point type. Minimum \$1.00 each insertion, payable in advance.

INFORMATION—Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED—Displayed or undisplayed. Rate per column inch, \$5.00. Unless on contract basis, advertisements must be paid in advance of insertion.

## FOR SALE

### CRUSHERS—ELEVATORS—SCREENS CONVEYORS

- 1—RELIANCE 8"x14" Portable Jaw Crusher
  - 1—NEW 9"x15" BEAUMONT Jaw Crusher
  - 2—Used 9"x15" CHAMPION Jaw Crushers
  - 1—10"x20" CHAMPION Jaw Crusher
  - 1—12"x20" BUCHANAN Jaw Crusher
  - 3—12"x26" CHAMPION Jaw Crushers
  - 1—No. 1030 CHAMPION Roller Bearing Crusher
  - 1—4½" TRAYLOR Gyratory Crusher
  - 1—No. 2F TELSMITH Gyratory Crusher
  - 2—NEW Small Hammer Mills
- JOHNSON & HOEHLER, INC.**  
Lansdowne, Penna.

- 1½ yd. Osgood Diesel Dragline, 60' Boom.
- 1½ yd. Byers Gas Shovel.
- 1 yd. B-Erie Gas-Air Shovel.
- ¾ yd. Byers Gas Shovel-Crane-Pull-shovel.
- 1 yd. Link-Belt K-30 Gas Shovel.
- 14 ton Whitcomb Loco-Gas-36 Ga.
- 20 ton Plymouth Loco-Gas-Std. Ga.
- 27-E Smith Paver, Model H-31.
- 5—Electric Hoists, 40, 50 and 60 HP.
- 1 yd. Round Shaft Buckets.
- 1 yd. and ½ yd. Dump Buckets.
- 2—Shovel Attach. Byers Bearcat Jr. Shovel Attachment for 41-B Bucyrus-Erie.

**J. T. WALSH**  
Brisbane Building Buffalo 3, New York

### ROTARY DRYERS AND KILNS



We have used dryers on hand and can make new dryers to meet your specifications. Write to:

**McDERMOTT BROS. CO.**  
ALLENTOWN, PENNA.

### USED MACHINERY FOR SALE

FARREL 36"x15" B JAW CRUSHER, COMPLETE WITH MOTOR AND DRIVE  
Motor 60HP Slip Ring 220 V, 3 ph. 60 C.  
Drive V-Flat with Ropes.  
Condition Excellent. Price Low.  
**EARLE C. BACON, INC.**  
17 John St., New York 7, N. Y.

### Shovel & Backhoe—½ Yd.

An exceptionally good little shovel, Bay City Model 20, for sale in Pennsylvania. A real buy. Wire

**ECONOMY COMPANY, INC.**  
49 Vanderbilt Ave., New York 17, N. Y.

### FOR SALE OR RENT

Air Compressors, Le Roi, portable, 105, 100, 210, 315 C.F.M., Air Hose, Rock Drills, Universal Jaw Crusher 10 x 30 with Power Unit, Wagon Drill. Many other items.

**FALLS CITY SALES COMPANY**  
148 N. Clay St. Louisville 2, Ky.  
Phone Jackson 0189

FOR SALE

FOR  
**IMMEDIATE  
DELIVERY**  
OF  
**RUBBER PRODUCTS**

Conveyor Belting...Transmission  
Belting...Elevator Belting...Fire,  
Water, Air, Steam, Suction or  
Welding Hose, etc.

CALL, WIRE or WRITE  
**CARLYLE**  
THE  
RUBBER HEADQUARTERS

**CARLYLE RUBBER PRODUCTS ARE  
NEW, GUARANTEED & LOW PRICED**

**CONVEYOR BELTING**

**ABRASIVE RESISTANT COVERS**

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

**TRANSMISSION BELTING**

HEAVY-DUTY FRICTION SURFACE		
Width Ply	Width Ply	Width Ply
18" - 6	10" - 6	6" - 5
16" - 6	10" - 5	5" - 5
14" - 6	8" - 6	4" - 5
12" - 6	8" - 5	4" - 4
12" - 5	6" - 6	3" - 4

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**ENDLESS "V" BELTS**

"A" WIDTH All Sizes "D" WIDTH All Sizes  
"B" WIDTH All Sizes "E" WIDTH All Sizes  
"C" WIDTH All Sizes Sold in Matched Sets  
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**FIRE HOSE**

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED		
Size	Length	Per Length
2 1/2"	50 feet	\$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1 1/2"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

**CARLYLE RUBBER CO., Inc.**  
62-66 PARK PLACE  
NEW YORK, N. Y.

1-24x36" Traylor Jaw Crusher  
1-22x50" Good Roads Jaw Crusher  
1-13x24" Farrel Jaw Crusher  
40" Telesmith Reduction Crusher  
32" Telesmith Reduction Crusher  
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36" Sand Classifier  
24"x96" Apron Feeder  
5-1937 Ford Dump Trucks  
1-3-yard Jaeger Mixer on Brock-  
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**BLUE BALL MACHINE WORKS**  
Blue Ball, Penna.

Insley, Type C, 1/2 yd., Gas.  
Shovel on Cats, 3/4 swing, 17' boom,  
12'6" stick.  
Rebuilt—Below OPA Ceiling.  
3/4 yd. single line and 2 yd. Indus-  
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3—Gates No. 6.  
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3—8'6" x 7'6" x 125'.  
1—7'6" x 7' x 125'.  
3—5'6" x 5' x 60'.

**ROTARY DRYERS**

5—5'6" x 5' x 60'.  
1—5' x 30'.

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8—42" Fuller Lehigh.  
1—30" x 24" Jeffrey Type A.

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2—4" and one 8". Also Valves.

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4—3' x 5' Hummer Double Deck.

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3" to 18" Motor and Turbine Drive.

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Northwest model 105 crawler gas combination shovel, crane and dragline, shovel dipper 1 yard, boom 40'.

Barber-Greene model 42 crawler gas disc type bucket loader.

Barber-Greene model 25 crawler gas disc type bucket loader.

Orton crawler gas full revolving crane, 30' boom, 1/2 yard bucket.

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All of the above overhauled, ready for work.

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For sale. One Model 7-2 yds. 80' dragline boom. One Model 8-60' boom, 32' cats, 2 1/2 yd. dragline. One Louisiana and one New York.

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- 1-21"x42" Single Roll McLanahan Crusher. Good shape. Extra set of fine segments. 15 V-belts.
- 1-PA 50 International Power Unit. Like new.
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Definitely in A No. 1 Condition  
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Model No. 76-3 1/2 yards  
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We solicit inquiries for smaller size shovels, draglines, etc., in gasoline and diesels.

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Large deposit of Gypsum located in New Mexico on top of ground, about 55 acres. Borders on highway near railroad. For particulars address C. W. Coon, 1230 Oakley Place, St. Louis 12, Mo.

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- One (1)-Sturtevant Vertical Emery Mill, new emery stones recently. Price \$675.00
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Sauerman 50 hp. electric dragline hoist.  
National 25 hp. electric double drum hoist.  
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Electric motors: 1-100 hp. with starters.  
Chicago air compressor, NBR, 525CFM.  
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Whitesomb 36" gauge 5 ton gasoline locomotive.  
Flat cars, 24" and 20" gauge.  
400 hp. V-belt-drive pulley unit.  
Enclosed 25 hp. angle drives with roller bearings.  
Blueprinting machine, model A, Shaw.

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Acme 6"x21" type C jaw crusher, roller bearings.  
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Buchanan Blake type jaw crusher, 10"x16".  
New England 11"x20" jaw crusher.  
Champion 12"x12" jaw crusher.  
Scholl 9"x16" jaw crusher.  
Reliance 8"x14" jaw crusher.  
Traylor "BULLDOG" 11" gyratory crusher.  
Robins double roll 24"x30" coal crusher.  
Single roll 24"x24" coal crusher.  
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Enclosed 10", 12", 16" bucket elevators to 100'.  
Enclosed 6" bucket elevator, 30' centers.  
Open 10" bucket chain elevator, 50'.  
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Open new 20" bucket 9 ply belt elevator, 52'.  
Continuous 30" bucket belt elevator, 35'.  
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New 4 ply conveyor belt, 20", 24", 30".  
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Two Hummer single deck 3'x5' vibrating screens.  
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Besser Victory K-3 Tamper with  
Molds to make 4", 6", 10" and 12"  
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Besser 25 cubic foot Mixer.  
2400-Steel Pallets 12 1/2"x18 1/2".  
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0-50 ton std. ga. heavy duty flat cars.

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Gas: 15, 30, 60, 100 & 120 HP.  
Electric: 30, 60, 100 & 150 HP.  
Steam: 6 1/2"x8, 10"x10, 8 1/2"x10, 10"x12, 12"x24.

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75, 90, 100, 300 HP. P. M. Engines.  
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175 KVA Worthington 3/60/2500.  
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4x10, 6x10 & 8x12 Tube Mills & 6'x22".  
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10,000 Gal., 15,000 Gal. & 20,000 Gal. Cap.

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18 in., 24 in., 30 in., 36 in. & 48 in. Symons Disc.  
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IDLER: 54 in., 48 in., 36 in., 30 in., 24 in., 20 in., 18 in., 16 in. & 14 in.  
Head & Tail-Pulleys-Takeup for all sizes.  
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36 in. x20 Ft., 3 Ft. x20 Ft., 4 Ft. x20 Ft., 54 in. x20 Ft., 48 in. x24 Ft., 5 Ft. x30 Ft., 5 Ft. x16 Ft., 5 Ft. x20 Ft., 6 Ft. x20 Ft., 6 Ft. x20 Ft., 6 Ft. x20 Ft., 10x20, 7 1/2x100 & 8x110 Ft. Kilns.

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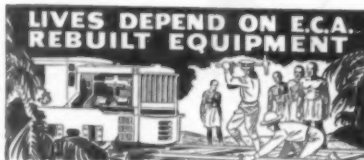
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Portable and stationary, belt with elec. or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

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- 1—10" Traylor Type "T" Bulldog Gyratory Crusher.
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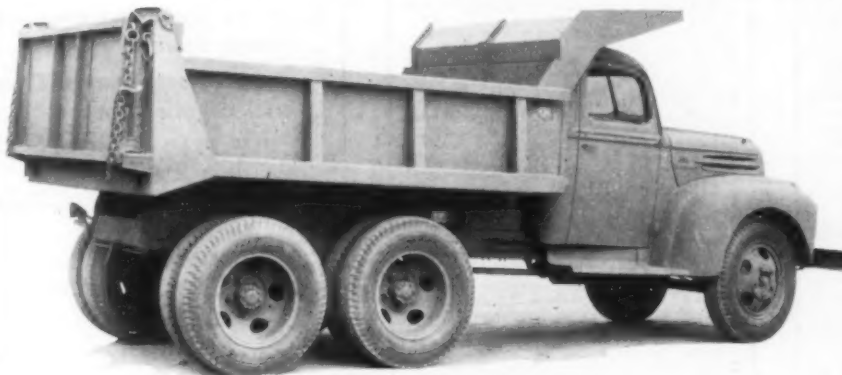
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**Capacity 250-350 Cu. Yd.  
Per Hour . . . Available  
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Complete Butler concrete plant. Excellent condition, used only 7 months. Adaptable for either commercial or construction use where high rate of concrete pour may be required. Equipped for manual, semi-automatic or automatic operational control. See details below.



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**BATCHERS.** 1 Butler aggregate 5 yd. capacity, complete with beam-type scale, manual operation.

1 Butler cement 3,000 lb. capacity, complete with beam-type scale, manual or automatic operation.

1 Butler water batcher 200 gals. capacity, beam-type scale, complete with 400 gal. surge tank and valves, manual or automatic operation.

**ELEVATOR & TRACK SCREW.** 300 bbl. per hour capacity, screw 37 ft. long, equipped for either box car or hopper car cement delivery. Complete with 20 hp. electric motor.

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1 Barber Greene 36" inclined conveyor 60' 6" long. Complete with 15 hp. electric motor, trusses and supporters.

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11—1942 Model Jaegers — High discharge, separate engine drive with two-speed transmission. 7 mounted on 1942 Dodge six wheelers, good rubber, excellent condition.

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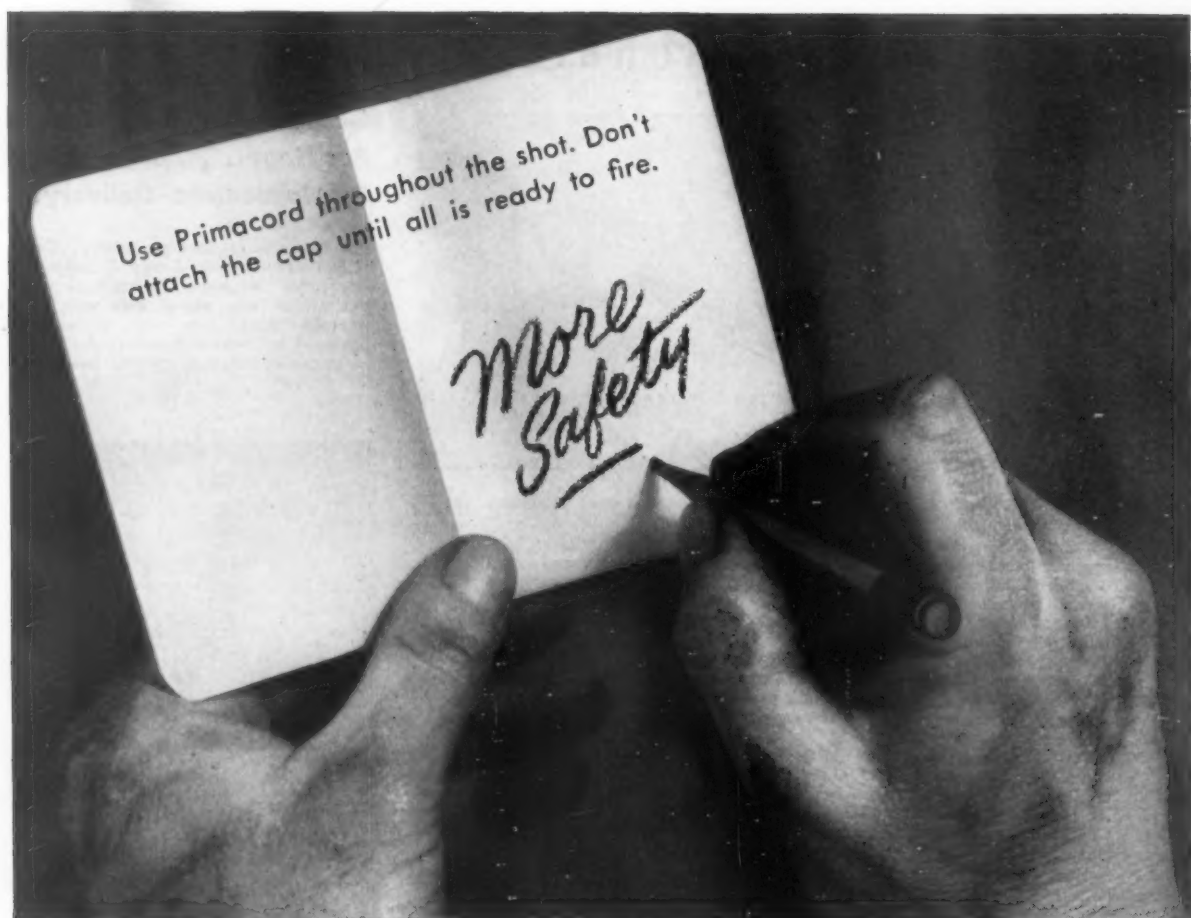


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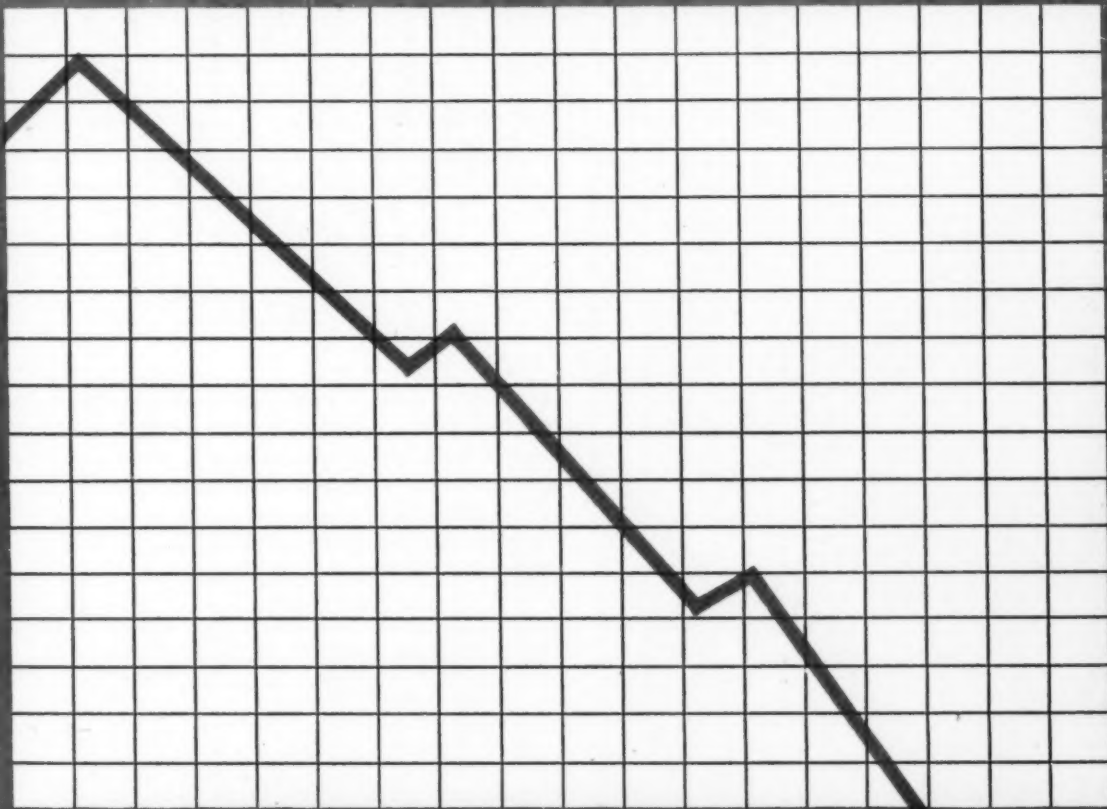
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# Your Blast Hole Drill Needs LUBRICATION

*to last the  
duration!*

You can do much to help your blast-hole drill endure the war years — while it's working its hardest and best — by lubricating it regularly. Be sure to follow carefully the complete lubrication instructions of your drill manufacturer, and you'll be well on your way to drilling as Uncle Sam likes it — at top speed for the duration.

## Here Are Some Points to Watch:

- 1 Bearings on crown sheave and sand line sheave should be lubricated once each shift.
- 2 On modern machines lubricate ball or roller bearings on jackshaft and engine pulley shaft with small amounts about once each week. Don't use graphite grease. On older machines with plain bearings, lubricate daily.
- 3 If your machine is caterpillar-mounted, lubricate crawler fittings once each week, oftener when machine is propelling long distances. Even when your drill is not travelling, keep cats lubricated against wearing motion developed in drilling.
- 4 Keep wire lines lubricated with wire rope lubricant to prolong their life.
- 5 Be sure to lubricate spudding pinion and bull reel pinion once each shift.
- 6 Don't overlook sand reel shaft bearings and operating lever connections — they should be lubricated once each shift.
- 7 Get complete lubrication instructions from your drill manufacturer and follow them carefully.

**Keep 'em Drilling**



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